

# Visual TikZ

**Version 0.64**

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mis à jour le 13 février 2017

**Objectifs :**

- Avoir une image par commande ou par paramètre.
- Avoir un texte réduit au strict minimum.
- Etre le plus complet possible au fil de mises à jour régulières.
- Garder la même structure que visuel pstricks

**Remarques :** Le code donné est minimal et ne sert qu'à montrer les commandes concernées. Les effets sont parfois exagérés pour bien les mettre en évidence. Pour en savoir plus, vous pouvez voir la documentation. Pour se faire j'ai indiqué le numéro de Section de pgfmanual

**Vous pouvez me contacter à mon e-mail personnel pour**

- me signaler les erreurs que vous avez constatés (merci d'indiquer la page où vous l'avez constaté)
- me faire part de vos commentaires, suggestions ...

**Quoi de neuf! :**

- ajout du module tikzpeople 116
- ajout du module circuits.logic 162
- ajout du module tikz-optics 166
- restructuration de l'index

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This work has the LPPL maintenance status 'maintained'.

The Current Maintainer of this work is M. Jean Pierre Casteleyn.

**Merci à :**

Till Tantau  
Alain Matthes  
Jim Diamond  
Falk Rühl  
Axel Kielhorn  
Nils Fleischhacker  
Michel Fruchart

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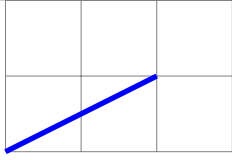
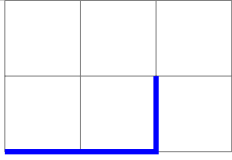
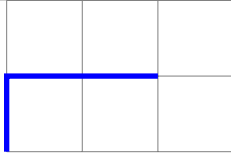
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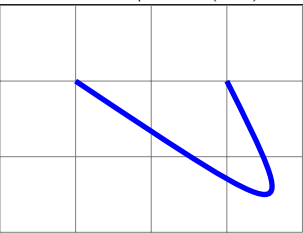
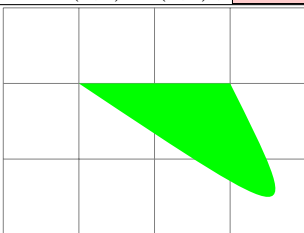
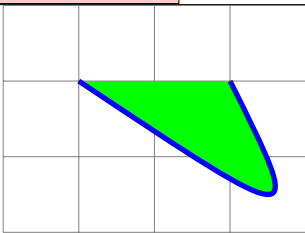


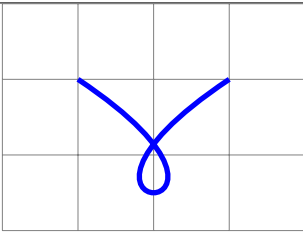
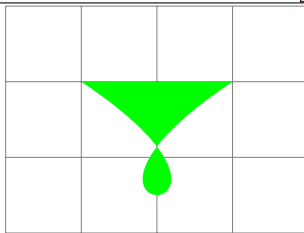
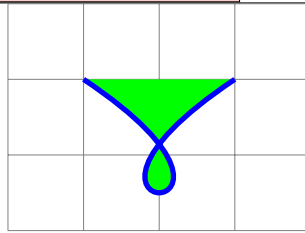
# 1 Chargement de TikZ

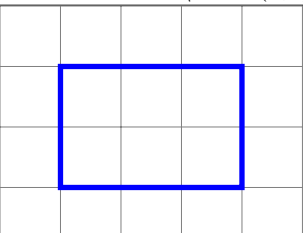
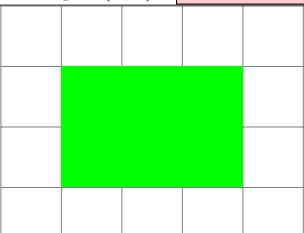
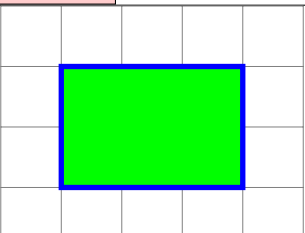
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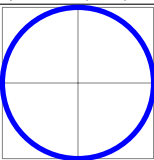
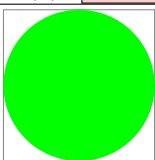
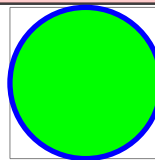
## 2 Les figures de base

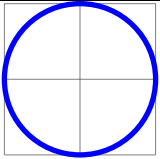
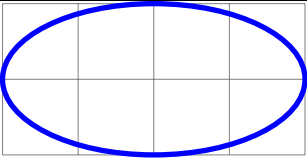
<code>\draw (0,0) -- (2,1);</code>	PGFmanual section : 14-2	<code>\draw (0,0) -  (2,1);</code>	<code>\draw (0,0)  - (2,1);</code>
			

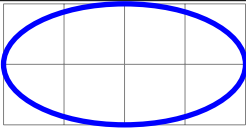
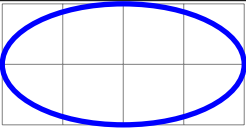
<code>\draw (0,2) .. controls (3,0) .. (2,2);</code>	PGFmanual section : 14-3	
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

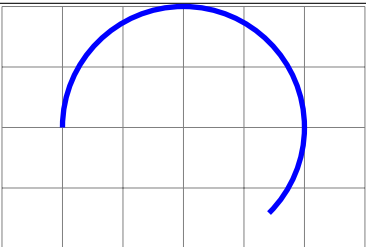
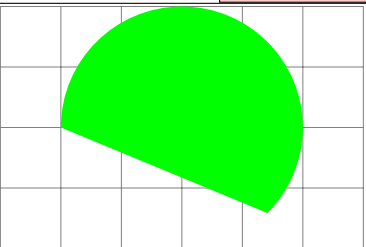
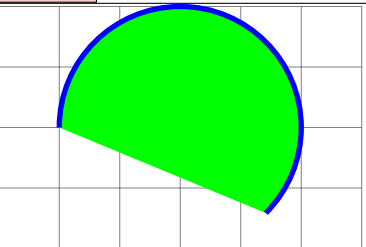
<code>\draw (0,2) .. controls (3,0) and (-1,0) .. (2,2);</code>	PGFmanual section : 14-3	
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

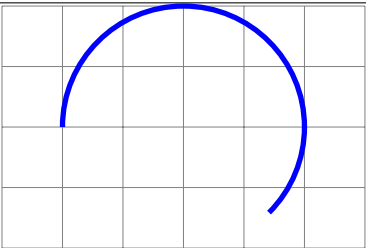
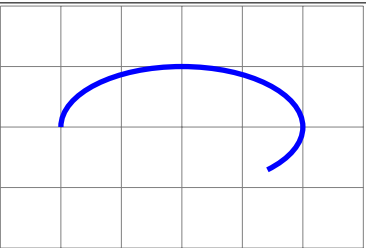
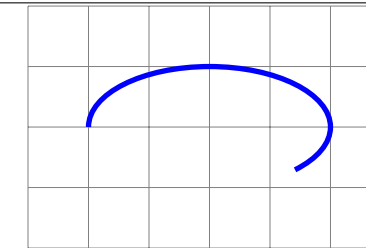
<code>\draw (0,0) rectangle (3,2);</code>	PGFmanual section : 14-4	
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

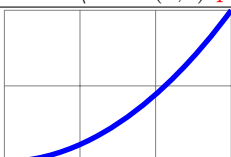
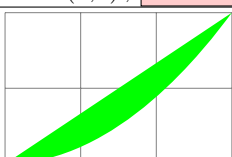
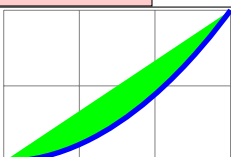
<code>\draw (1,1) circle (1);</code>	PGFmanual section : 14-6	
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

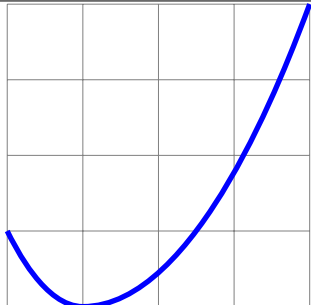
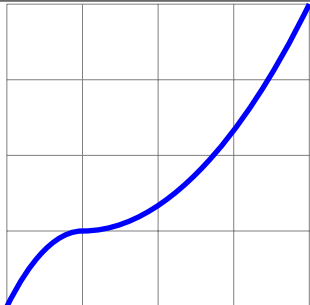
<code>\draw (1,1) circle [radius=1cm];</code>	<code>\draw (1,1) ellipse [x radius=2cm,y radius=1cm]</code>
	
<code>radius=1cm</code>	<code>x radius=2cm,y radius=1cm</code>

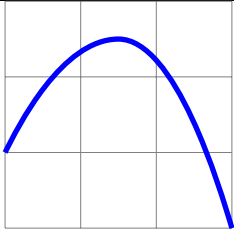
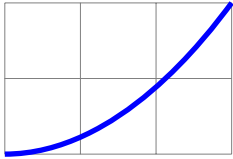
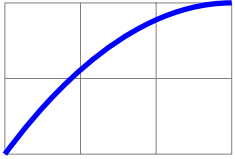
<code>\draw (1,1) circle (2 and 1);</code>	<code>\draw (1,1) ellipse (2 and 1);</code>
	

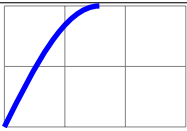
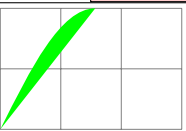
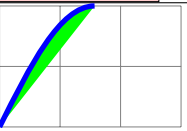
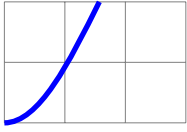
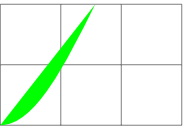
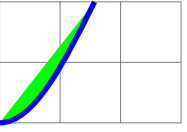
<code>\draw (-2,0) arc (180 :-45 :2);</code> PGFmanual section : 14-7		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

<code>\draw (-2,0) arc [start angle=180, end angle=-45,radius=1]</code>	<code>\draw (-2,0) arc (180 :-45 :2 and 1)</code>	
		
<code>radius=1</code>	<code>x radius=1,y radius=.5</code>	

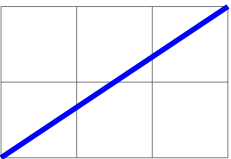
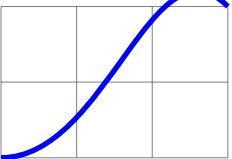
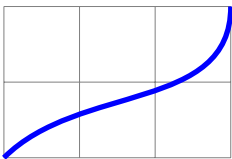
<code>\draw (0,0) parabola (3,2);</code> PGFmanual section : 14-9		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

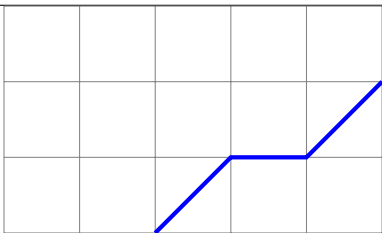
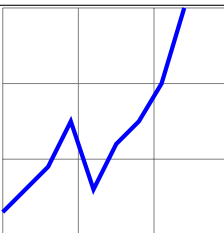
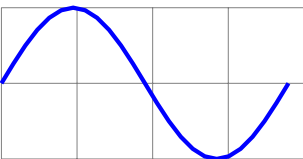
	
<code>\draw(0,1) parabola bend (1,0) (4,4);</code>	<code>\draw(0,0) parabola[bend pos=0.25] (4,4);</code>

<code>\draw(0,1) parabola [parabola height=2cm] (3,0);</code>	<code>\draw(0,0) parabola[bend at start] (3,2);</code>	
		
	<code>[bend at start]</code>	<code>[bend at end]</code>

<code>\draw (0,0) sin (1.57,2);</code> PGFmanual section : 14-10		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>
		
<code>\draw (0,0) cos (1.57,2);</code>		

PGFmanual section : 14-13

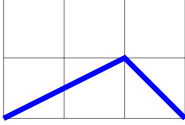
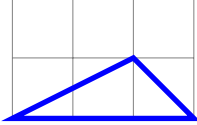
		
<code>\draw (0,0) to (3,2);</code>	<code>\draw[out=0] (0,0) to (3,2);</code>	<code>\draw[in=-90] (0,0) to (3,2);</code>
voir section 7.2 page 47		

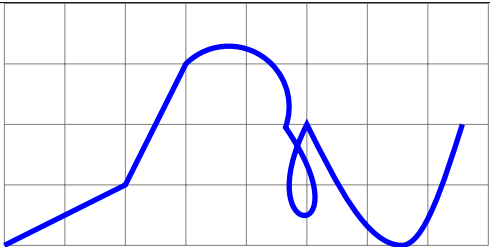
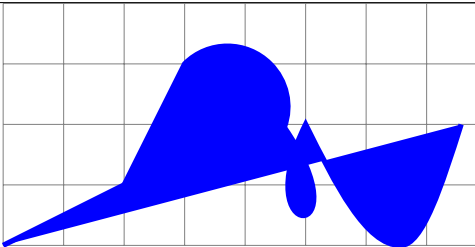
Dessin avec plot		PGFmanual section : 14-12	PGFmanual section : 22
une liste de coordonnées		un fichier de coordonnées	une équation mathématique
			
plot coordinates {(2,0) (3,1) (4,1) (5,2)}		plot file {table.dat}	plot (\x,{sin(\x)})
voir page 122			

### 3 Chemin

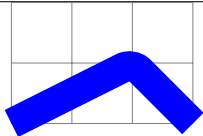
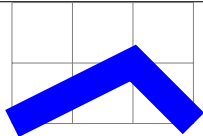
#### 3.1 Notion de Chemin

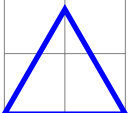
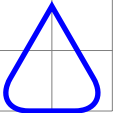
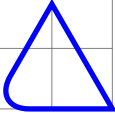
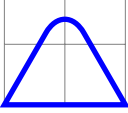
PGFmanual section : 14

	
<code>\draw (0,0) -- (2,1) -- (3,0);</code>	<code>\draw (0,0) -- (2,1) -- (3,0) -- cycle;</code>

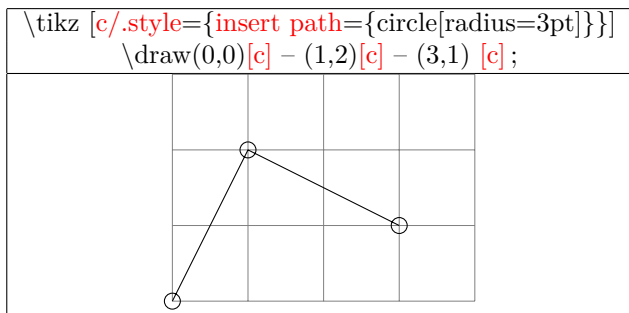
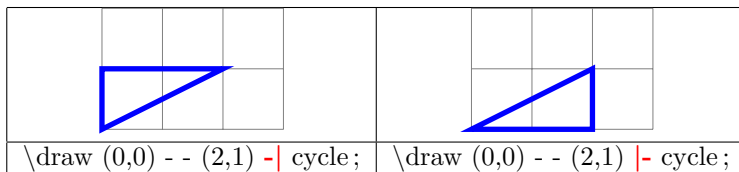
<code>\draw (0,0) -- (2,1) -- (3,3) arc (135 :-20 :1) .. controls (6,0) and (4,0) .. (5,2) sin (6.57,0) cos (7.57,2);</code>	
	
<code>\draw</code>	<code>\filldraw</code>

PGFmanual section : 14-5

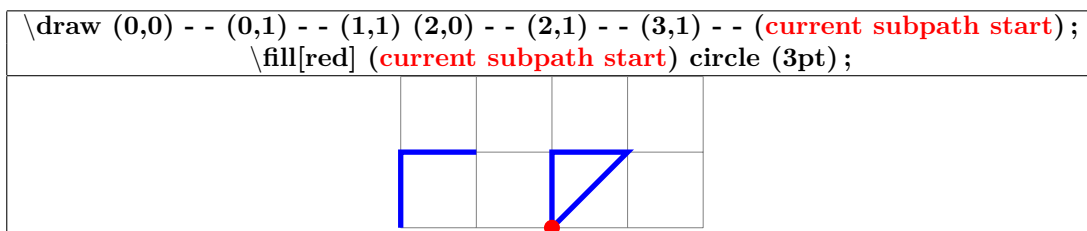
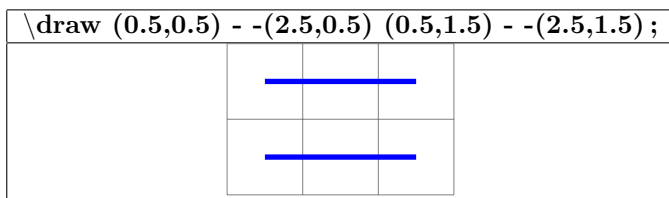
	
<code>\draw [rounded corners] (0,0) -- (2,1) -- (3,0);</code>	<code>\draw [sharp corners] (0,0) -- (2,1) -- (3,0);</code>

	<code>\draw [rounded corners=0.5cm] (0,0) -- (1,1.732) -- (2,0) -- cycle;</code>
	<code>\draw (0,0) -- (1,1.732) [rounded corners=0.5cm] -- (2,0) -- cycle;</code>
	<code>\draw (0,0) -- (1,1.732) -- (2,0)[rounded corners=0.5cm] -- cycle;</code>
	<code>\draw [rounded corners=0.5cm] (0,0) -- (1,1.732)[sharp corners] -- (2,0) -- cycle;</code>

PGFmanual section : 14-2-2

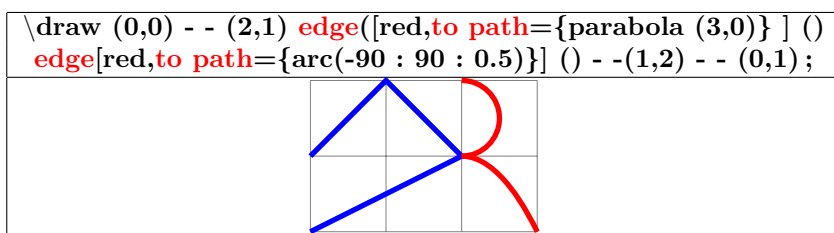
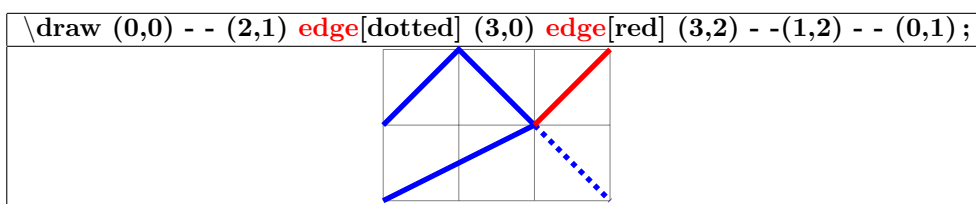


Coupure de chemin PGFmanual section : 14-1



### 3.2 Chemins dans un chemin









PGFmanual section : 17-12





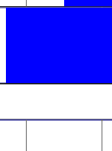
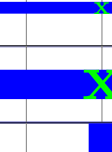

## 4 Les paramètres disponibles

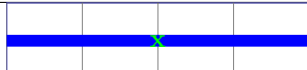



### 4.1 Épaisseur de ligne

PGFmanual section : 15-3-1




<code>\tikz \draw[line width=.2cm] (0,0) - - (1,1) ;</code>			
			
<code>[line width=.2cm]</code>	<code>[ultra thin]</code> (0.1pt)	<code>[very thin]</code> (0.2pt)	<code>[thin]</code> (0.4pt)
			
<code>[semithick]</code> (0.6pt)	<code>[thick]</code> (0.8pt)	<code>[very thick]</code> (1.2pt)	<code>[ultra thick]</code> (1.6pt)

### 4.2 Dimensions disponibles

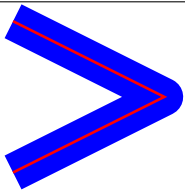
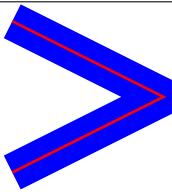
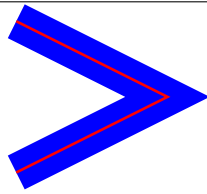
	<code>\draw[line width=10pt] (2,0) to (2,1) ;</code>
	<code>\draw[line width=10bp] (2,0) to (2,1) ;</code>
	<code>\draw[line width=10mm] (2,0) to (2,1) ;</code>
	<code>\draw[line width=1cm] (2,0) to (2,1) ;</code>
	<code>\draw[line width=1in] (2,0) to (2,1) ;</code>

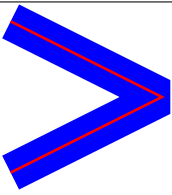
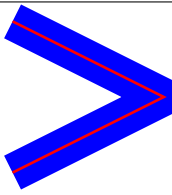
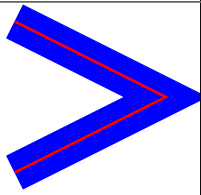
	<code>\draw[line width=1ex] (0,0.5) to (4,.5) ;</code>
	<code>\Huge \draw[line width=1ex] (0,0.5) to (4,.5) ;</code>
	<code>\draw[line width=1em] (2,0) to (2,1) ;</code>
	<code>\Huge \draw[line width=1em] (2,0) to (2,1) ;</code>

### 4.3 Terminaisons de lignes

		
<code>[line cap=rect ]</code>	<code>[line cap=butt ]</code>	<code>[line cap=round ]</code>

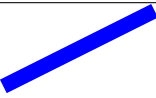
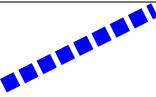
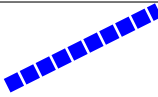
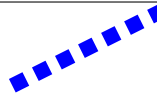
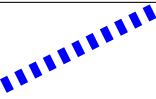
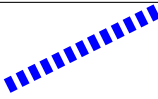
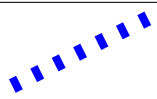
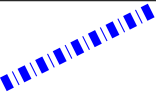
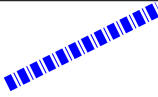
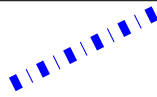
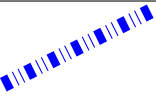
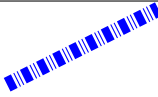
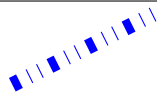
4.4 Jonction de lignes











\draw[line join=round ] (0,0) - - (2,1) - - (0,2);		
		
[line join=round ]	[line join=bevel ]	[line join=miter ]


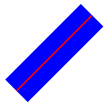


\draw[miter limit=1] (0,0) - - (2,1) - - (0,2); (Par défaut : : miter limit=10)		
		
miter limit=1	miter limit=2	miter limit=3



4.5 Styles de ligne

PGFmanual section : 15-3-2

\tikz \draw[solid,line width=2mm] (0,0) - - (2,1);		
		
[solid]		
		
[dotted]	[densely dotted]	[loosely dotted]
		
[dashed]	[densely dashed]	[loosely dashed]
		
[dash dot]	[densely dash dot]	[loosely dash dot]
		
[dash dot dot]	[densely dash dot dot]	[loosely dash dot dot]













						
[dash pattern=on 1cm off 0.25cm on 0.25cm off 0.5cm]						
						
[dash pattern=on 1cm off .25cm on .25cm off .5cm,dash phase=1cm]						


\tikz \draw[line width=.2cm, <b>double</b> ] (0,0) - - (1,1) ;			
			
<b>double</b>	draw=blue,double=red	<b>double distance</b> =.3cm	<b>double distance between line centers</b> =.3cm

\Huge = \tikz \draw[ <b>double equal sign distance</b> ] (0,0) - - (4,0) ;	
	
\Huge	\large









## 4.6 Remplissage en motifs

Charger l'extension : \usetikzlibrary{patterns}

\draw[ <b>pattern= dots</b> ] (0,0) - - (3,1) ;		
		
<b>dots</b>	<b>fivepointed stars</b>	<b>sixpointed stars</b>
		
<b>grid</b>	<b>horizontal lines</b>	<b>vertical lines</b>
		
<b>north east lines</b>	<b>north west lines</b>	<b>rosshatch</b>
		
<b>crosshatch dots</b>	<b>bricks</b>	<b>checkerboard</b>

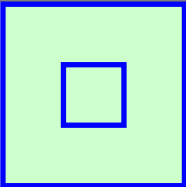
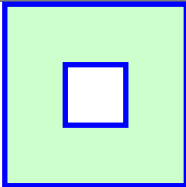
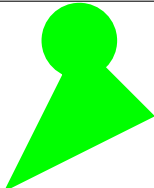
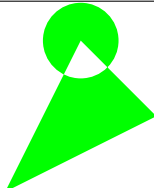
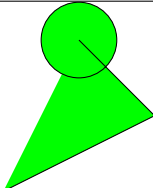
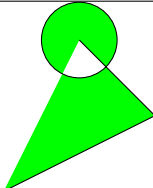

\draw[pattern=fivepointed stars, <b>pattern color</b> =red] (0,0) rectangle (3,1) ;



\draw[pattern= <b>checkerboard light gray</b> ] (0,0) -- ((3,2);		
		
<b>checkerboard light gray</b>	<b>horizontal lines light gray</b>	<b>horizontal lines gray</b>
		
<b>horizontal lines dark gray</b>	<b>horizontal lines light blue</b>	<b>horizontal lines dark blue</b>
		
<b>crosshatch dots gray</b>	<b>crosshatch dots light steel blue</b>	




## 4.7 Règle de remplissage




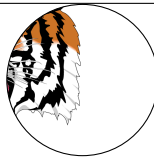
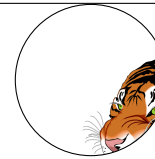
PGFmanual section : 15-5-2

nonzero rule (Par défaut : )			
			
<code>\filldraw [fill=green !20] (0,0) -- (0,3) -- (3,3) -- (3,0) -- cycle (1,1) -- (1,2) -- (2,2) -- (2,1) -- cycle;</code>		<code>\filldraw [fill=green !20] (0,0) -- (0,3) -- (3,3) -- (3,0) -- cycle (1,1) -- (2,1) -- (2,2) -- (1,2) -- cycle;</code>	
even odd rule			
<code>\[fill=[green] (0,0) -- (2,1) -- (1,2) circle (.5cm);</code>		<code>\filldraw[fill=green] (0,0) -- (2,1) -- (1,2) circle (.5cm);</code>	
			
<code>[fill=green]</code>	<code>[even odd rule,fill=green]</code>	<code>[fill=green]</code>	<code>[even odd rule,fill=green]</code>

## 4.8 Remplissage à l'aide d'une image

PGFmanual section : 15-6



\draw [ <b>path picture</b> ={ \node at (path picture bounding box.center) {\includegraphics[height=3cm]{tiger}};}] (0,1) circle (1);		
		
(0,1) circle (1)	(0,0) -- (-1,1) -- (0,2) -- (1,1) -- cycle	(1,0) parabola[parabola height=2cm] (3,0)


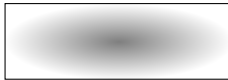
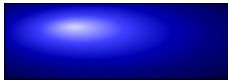
<code>\draw [path picture={ \node at (path picture bounding box.north) {includegraphics[height=3cm]{tiger}};}] (0,1) circle (1);</code>				
				
north	south	east	west	south east







4.9 Ombrage




4.9.1 Ombrages disponibles

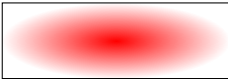

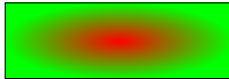
PGFmanual section : 15-7

	
<code>\shade (0,0) rectangle (3,1);</code>	<code>\shadedraw (0,0) rectangle (3,1);</code>

<code>\shadedraw[shading=axis](0,0) rectangle (3,1);</code>		
		
axis	radial	ball

		
<code>[left color=red]</code>	<code>[right color=green]</code>	<code>left color=red,right color=green</code>
		
<code>[top color=red]</code>	<code>[bottom color=green]</code>	<code>middle color=red</code>



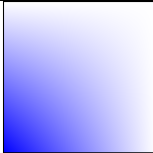
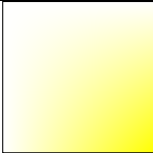
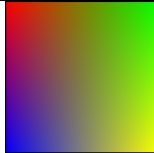
		
<code>shading angle=90</code>	<code>right color=green</code> <code>[shading angle=45]</code>	<code>left color=red</code> <code>shading angle=-45</code>

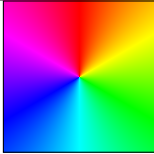
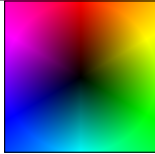

		
<code>inner color=red</code>	<code>outer color=green</code>	<code>inner color=red outer color=green</code>

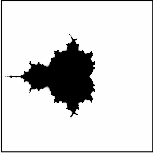
4.9.2 Bibliothèque shadings

PGFmanual section : 65

Charger l’extension : `\usetikzlibrary{shadings}`





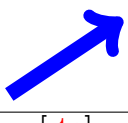
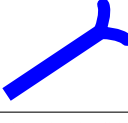
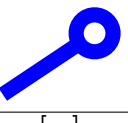
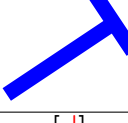
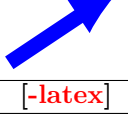

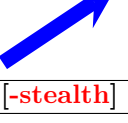

\shadedraw[upper left=red] (0,0) rectangle (2,2);				
				
upper left=red	upper right=green	lower left=blue	lower right=yellow	

\shadedraw[shading=color wheel ] (0,0) rectangle (2,2);		
		
shading=color wheel	shading=color wheel black center	shading=color wheel white center


shading=Mandelbrot set


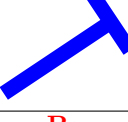



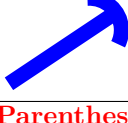



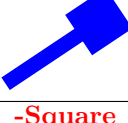



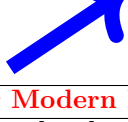






## 4.10 Les extrémités

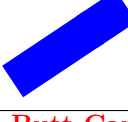


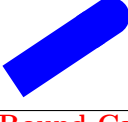

### 4.10.1 Chargé automatiquement avec TikZ

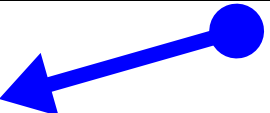
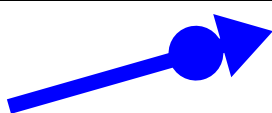
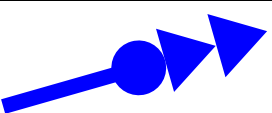
\tikz \draw[->,line width=.2cm,blue] (0,0) - - (1.5,1) ;			
			
[>]	[<-]	[<->]	[>->]
			
[-to]	[-to reversed]	[-o]	[- ]
			
[-latex]	[-latex reversed]	[-stealth]	[-stealth reversed]

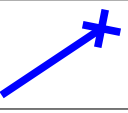
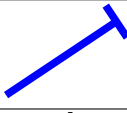
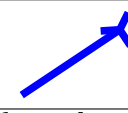
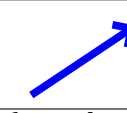
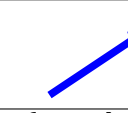
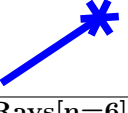
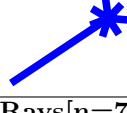
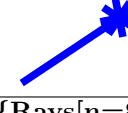


### 4.10.2 « library arrow.meta »

Charger l'extension : \usetikzlibrary{arrows.meta}


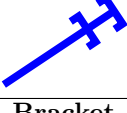

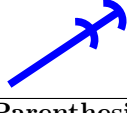

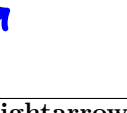

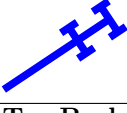
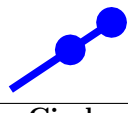

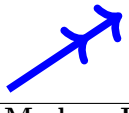

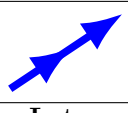
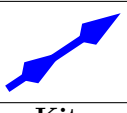
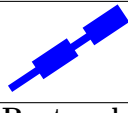
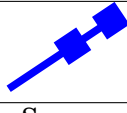
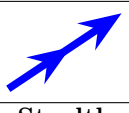

\tikz \draw[ -Arc Barb,line width=.2cm,blue ] (0,0) - - (1.5,1) ;				
				
-Arc Barb	-Bar	-Bracket	-Hooks	-Stealth
				
-Parenthesis	-Straight Barb	-Tee Barb	-Classical TikZ Rightarrow	-Square
				
-Circle	-Implies, double	-Rectangle	-Computer Modern Rightarrow	-Turned Square
			[To]	
				
-Diamond	-Ellipse	-Kite	[-Latex]	-Triangle

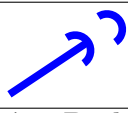
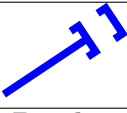
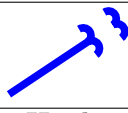
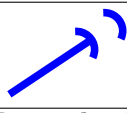
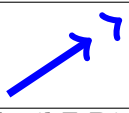
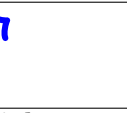

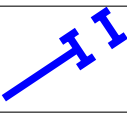
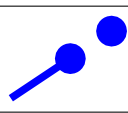
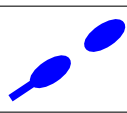
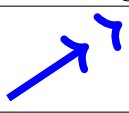
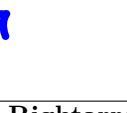
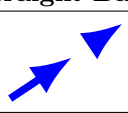
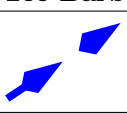
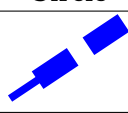
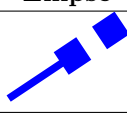
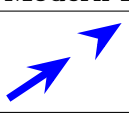
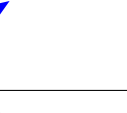
\tikz \draw[-Butt Cap,line width=.2cm,blue] (0,0) - - (1.5,1) ;				
				
-Butt Cap	-Fast Round	-Fast Triangle	-Round Cap	-Triangle Cap

<code>\tikz \draw[Triangle-Circle,line width=.2cm,blue] (0,0) - - (3.5,1);</code>		
		
<code>Triangle-Circle</code>	<code>{Circle[] Triangle[]}</code>	<code>{Circle[] . Triangle[] Triangle[] }</code>

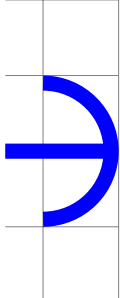
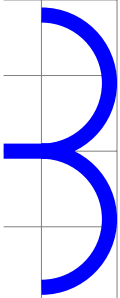
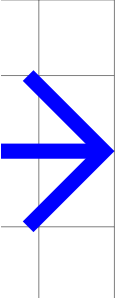
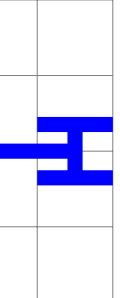
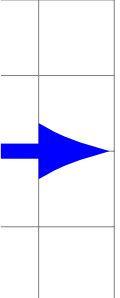
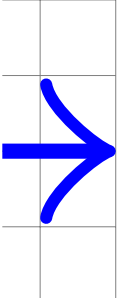
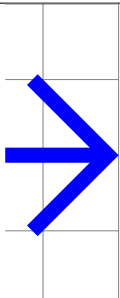
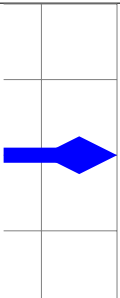
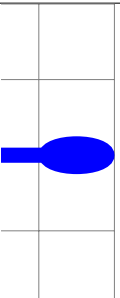
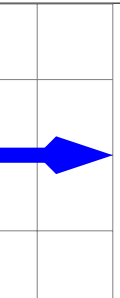
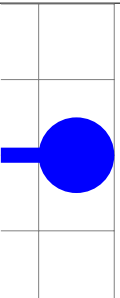
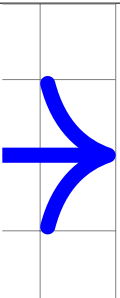
<code>\tikz \draw[-Rays,line width=.1cm,blue] (0,0) - - (1.5,1);</code>				
				
<code>Rays</code>	<code>{Rays[n=2]}</code>	<code>{Rays[n=3]}</code>	<code>{Rays[n=4]}</code>	<code>{Rays[n=5]}</code>
				
<code>{Rays[n=6]}</code>	<code>{Rays[n=7]}</code>	<code>{Rays[n=8]}</code>	<code>{Rays[n=9]}</code>	<code>{Rays[n=10]}</code>

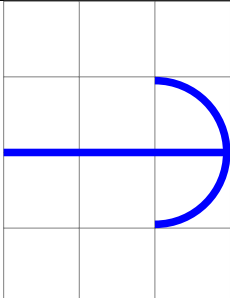
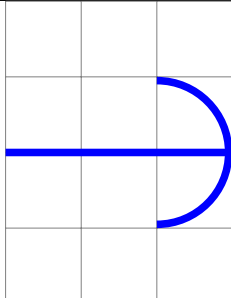
Paramètre sep PGFmanual section : 16-4-2

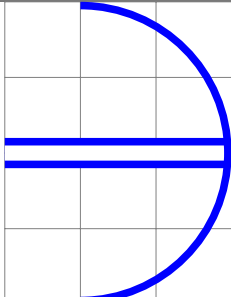
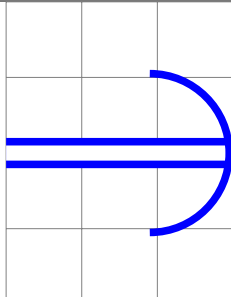
<code>\tikz \draw[-{Arc Barb[sep=.25cm] Arc Barb[]},line width=.1cm,blue] (0,0) - - (1.5,1);</code>					
					
<code>Arc Barb</code>	<code>Bracket</code>	<code>Hooks</code>	<code>Parenthesis</code>	<code>Classical TikZ Rightarrow</code>	<code>Rays</code>
					
<code>Straight Barb</code>	<code>Tee Barb</code>	<code>Circle</code>	<code>Ellipse</code>	<code>Computer Modern Rightarrow</code>	<code>Triangle</code>
					
<code>Latex</code>	<code>Kite</code>	<code>Rectangle</code>	<code>Square</code>	<code>Stealth</code>	<code>Turned Square</code>

<code>\tikz \draw[-{Arc Barb[sep=.25cm] • Arc Barb[]},line width=.1cm,blue] (0,0) - - (1.5,1);</code>					
					
<code>Arc Barb</code>	<code>Bracket</code>	<code>Hooks</code>	<code>Parenthesis</code>	<code>Classical TikZ Rightarrow</code>	<code>Rays</code>
					
<code>Straight Barb</code>	<code>Tee Barb</code>	<code>Circle</code>	<code>Ellipse</code>	<code>Computer Modern Rightarrow</code>	<code>Triangle</code>
					
<code>Latex</code>	<code>Kite</code>	<code>Rectangle</code>	<code>Square</code>	<code>Stealth</code>	<code>Turned Square</code>

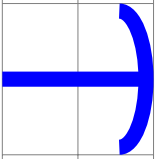
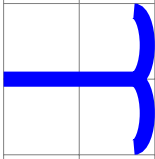
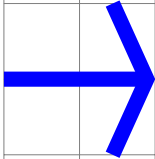
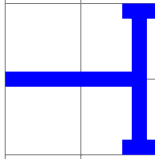
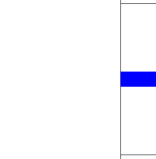
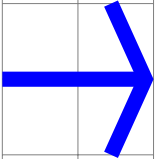
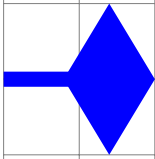
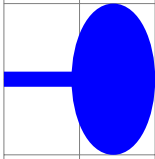
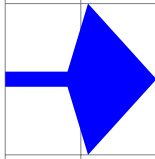
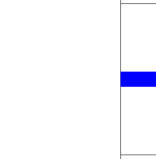
Paramètre length PGFmanual section : 16-3-1

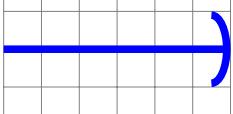
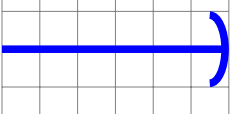
\tikz \draw[-{Arc Barb[length=1cm]},line width=.2cm,blue] (0,0) - - (1,1) ;					
					
Arc Barb	Hooks	Straight Barb	Tee Barb	Latex	Classical TikZ Rightarrow
					
Straight Barb	Diamond	Ellipse	Kite	Circle	Computer Modern Rightarrow

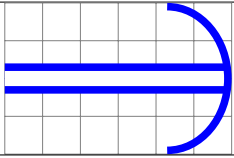
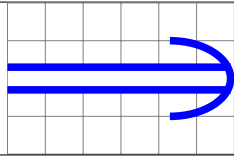
\tikz \draw[-{Arc Barb[length=0cm 10]},line width=.1cm,blue] (0,0) - - (3,1) ;	
	
[length=0cm 10]	[length=.5cm 5]
0cm + 10 x .1cm = 1cm	.5cm + 5 x .1cm = 1cm

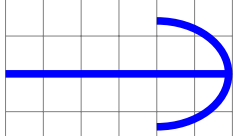
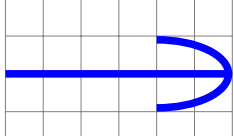
\tikz \draw[-{Arc Barb[length=0cm 5 ]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (3,1) ;	
	
[length=0cm 5 ]	[length=0cm 5 .6 ]
0cm + 5 x (.1cm + 2 mm + .1cm ) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm) ) = 11 mm

Paramètre width PGFmanual section : 16-3-1

\tikz \draw[-{Arc Barb[width=2cm]},line width=.2cm,blue] (0,0) - - (1,1);				
				
Arc Barb	Hooks	Straight Barb	Tee Barb	Classical TikZ Rightarrow
				
Straight Barb	Diamond	Ellipse	Kite	Computer Modern Rightarrow

\tikz \draw[-{Arc Barb[width=0cm 10]},line width=.1cm,blue] (0,0) - - (3,1);	
	
[width=0cm 10]	[width=.5cm 5]
0cm + 10 x .1cm = 1cm	.5cm + 5 x .1cm = 1cm

\tikz \draw[-{Arc Barb[width=0cm 5]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (3,1);	
	
[width=0cm 5]	[width=0cm 5 .6]
0cm + 5 x (.1cm + 2 mm + .1cm) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm)) = 11 mm

\tikz \draw[-{Arc Barb[length=1cm,width=0cm 1.5]},line width=.1cm,blue] (0,0) - - (3,1);	
	
[width'=0cm 1.5]	[width'=.5cm .5]
0cm + 1.5 x 1cm = 1.5cm	.5cm + .5 x 1cm = 1cm

<code>\tikz \draw[-{Arc Barb[length=1cm,width'=0cm 1.5 ]},line width=.1cm,blue,double,double distance = 2 mm]</code>	
<code>[width'=0cm 1.5 ]</code>	<code>[width'=0cm 1.5 .6 ]</code>
$0\text{cm} + 1.5 \times 1\text{cm} = 1.5\text{cm}$	$0\text{cm} + 1.5 \times (.6 \times 1\text{cm} + (1-.6)(1\text{cm} + 2\text{ mm} + 1\text{cm})) = 11\text{ mm}$

Paramètre inset PGFmanual section : 16-3-1

<code>\tikz \draw[-{Tee Barb[inset=0pt]},line width=.2cm,blue] (0,0) - - (1,1);</code>		
Tee Barb[inset=0pt]	Kite[inset=0pt]	Stealth[inset=0pt]
Tee Barb[inset=1cm]	Kite[inset=1cm]	Stealth[inset=.5cm]

<code>\tikz \draw[-{Fast Round[inset=1cm]},line width=.2cm,blue] (0,0) - - (1,1);</code>			
Fast Round[inset=1cm]	Fast Round[inset=2cm]	Fast Triangle[inset=1cm]	Fast Triangle[inset=2cm]

inset=1cm 1	inset=1cm 2	inset=1cm 4	inset=1cm .2

inset=0cm 1	inset=0cm 2	inset=0cm 4	inset=0cm .2

inset=0cm .2	inset=0cm .2 2	inset=0cm .2 10	inset=0cm 2 .5



inset=0cm .2	inset=0cm .2 2	inset=0cm .2 10	inset=0cm 2 .5

Paramètre angle PGFmanual section : 16-3-1

\tikz \draw[-{Straight Barb[angle=60 :.5cm 1]},line width=.2cm,blue] (0,0) - - (1,1);				
[angle=60 :.5cm 1]	[angle=60 :.5cm 1]	[angle=60 :.5cm 20]	[angle=60 :.5cm 5]	[angle=90 :.5cm 5]

\tikz \draw[-{Triangle[angle=60 :.5cm 1]},line width=.2cm,blue] (0,0) - - (1,1);				
[angle=60 :.5cm 1]	[angle=60 :.5cm 1]	[angle=60 :.5cm 20]	[angle=60 :.5cm 5]	[angle=90 :.5cm 5]

Paramètre scale PGFmanual section : 16-3-2





















\tikz \draw[-{Arc Barb[scale=4]},line width=.1cm,blue] (0,0) - - (3,0);		
scale=4	scale length=4	scale width=4

Paramètre arc PGFmanual section : 16-3-3

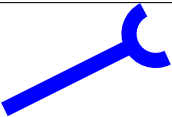
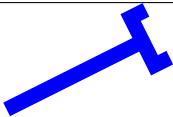
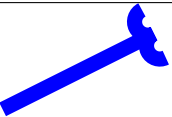
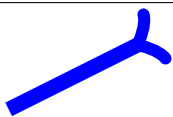
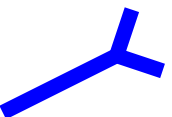
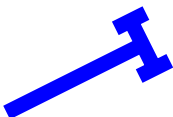
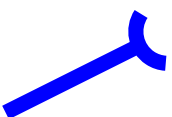
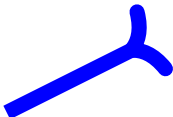
\tikz \draw[-{Arc Barb[arc=270]},line width=.2cm,blue] (0,0) - - (3,1);			
Arc Barb[arc=270]	Arc Barb[arc=360]	Hooks[arc=270]	Hooks[arc=360]

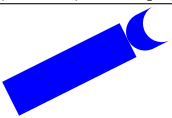
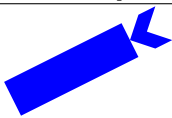
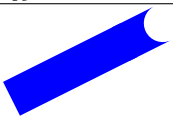
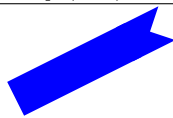
Paramètre slant PGFmanual section : 16-3-4

\tikz \draw[-{Arc Barb[slant=.3]},line width=.2cm,blue] (0,0) - - (1,1);				
slant=0	slant=0.3	slant=0.5	slant=0.8	slant=1

\tikz \draw[-{Arc Barb[slant=.5]},line width=.2cm,blue] (0,0) - - (1,1);				
				
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow
				
Straight Barb	Tee Barb	Circle	Diamond	Ellipse
				
Kite	Latex	Rectangle	Square	Stealth
				
Turned Square	Fast Round	Fast Triangle	Round Cap	Triangle Cap

Paramètre reversed PGFmanual section : 16-3-5

\tikz \draw[-{Arc Barb[reversed]},line width=.2cm,blue] (0,0) - - (2,1);			
			
Arc Barb	Bracket	Hooks	Classical TikZ Rightarrow
			
Straight Barb	Tee Barb	Parenthesis	Computer Modern Rightarrow

\tikz \draw[-{Fast Round[reversed]},line width=.5cm,blue] (0,0) - - (2,1);			
			
Fast Round	Fast Triangle	Round Cap	Triangle Cap

Paramètre left PGFmanual section : 16-3-5

\tikz \draw[-{Arc Barb[ <span style="color: red;">left</span> ]},line width=.2cm,blue] (0,0) - - (1.5,1) ;					
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Triangle
Straight Barb	Tee Barb	Circle	Diamond	Ellipse	Turned Square
Kite	Latex	Rectangle	Square	Stealth	Rays

Paramètre right PGFmanual section : 16-3-5

\tikz \draw[-{Arc Barb[ <span style="color: red;">right</span> ]},line width=.2cm,blue] (0,0) - - (1.5,1) ;					
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Triangle
Straight Barb	Tee Barb	Circle	Diamond	Ellipse	Turned Square
Kite	Latex	Rectangle	Square	Stealth	Rays

Paramètre harpoon PGFmanual section : 16-3-5

\tikz \draw[-{Arc Barb[ <span style="color: red;">harpoon</span> ]},line width=.2cm,blue] (0,0) - - (1,1) ;						
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Straight Barb	Tee Barb
\tikz \draw[-{Arc Barb[harpoon, <span style="color: red;">swap</span> ]},line width=.2cm,blue] (0,0) - - (1,1) ;						
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Straight Barb	Tee Barb

Paramètre color PGFmanual section : 16-3-6

`\tikz \draw[-{Arc Barb[color=red],line width=.2cm,blue} (0,0) - - (1,1);`

Bracket[ <span style="color: red;">color=red</span> ]	Bracket[ <span style="color: green;">color=green</span> ]	Bracket[ <span style="color: red;">red</span> ]

<code>\tikz \draw[-{Arc Barb[<span style="color: red;">red</span>],line width=.2cm,blue} (0,0) - - (1,1);</code>				
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow
Straight Barb	Tee Barb	Circle	Diamond	Ellipse
Kite	Latex	Rectangle	Square	Stealth
Triangle	Turned Square	Rays		

Paramètre fill PGFmanual section : 16-3-6







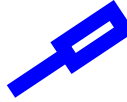
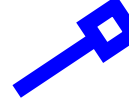


`\tikz \draw[-{Circle[fill=red],line width=.2cm,blue} (0,0) - - (1,1);`

Circle	Diamond	Ellipse	Kite	Triangle
Latex	Rectangle	Square	Stealth	Turned Square

















`\tikz \draw[-{Circle[fill=none],line width=.2cm,blue} (0,0) - - (1,1);`

















Circle	Diamond	Ellipse	Kite	Triangle
Latex	Rectangle	Square	Stealth	Turned Square

Paramètre open PGFmanual section : 16-3-6

















\tikz \draw[-{Circle[open]},line width=.2cm,blue] (0,0) - - (1.5,1);				
				
Circle	Diamond	Ellipse	Kite	Triangle
				
Latex	Rectangle	Square	Stealth	Turned Square

















Paramètre line cap : round or butt PGFmanual section : 16-3-7

\tikz \draw[-{Arc Barb[line cap=butt]},line width=.2cm,blue] (0,0) - - (1,1);							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

















\tikz \draw[-{Arc Barb[line cap=round]},line width=.2cm,blue] (0,0) - - (1,1);							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

Paramètre line join : round or miter PGFmanual section : 16-3-7

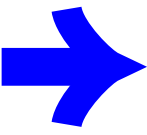



\tikz \draw[-{Arc Barb[line join=miter]},line width=.2cm,blue] (0,0) - - (1,1);							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

\tikz \draw[-{Arc Barb[line cap=round ]},line width=.2cm,blue] (0,0) - - (1,1) ;							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

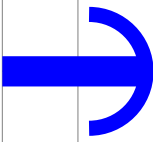
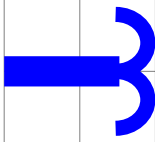
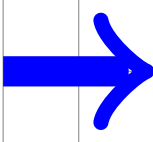
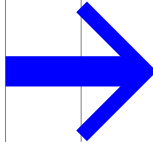
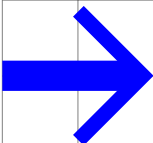
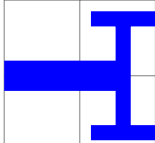
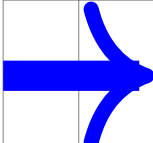
Paramètre round PGFmanual section : 16-3-7

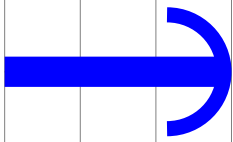
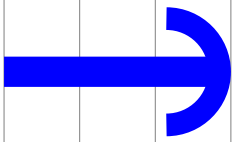
\tikz \draw[-{Arc Barb[round ]},line width=.2cm,blue] (0,0) - - (1,1) ;							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

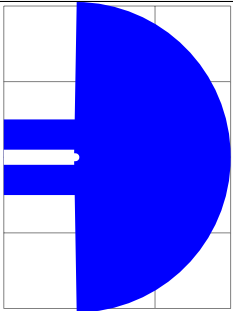
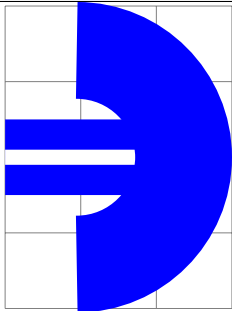
Paramètre sharp PGFmanual section : 16-3-7

\tikz \draw[-{Classical TikZ Rightarrow[sharp ]},line width=.2cm,blue] (0,0) - - (2,0) ;			
-{Classical TikZ Rightarrow[sharp]}		-{Computer Modern Rightarrow[sharp]}	
			
sharp	[ ]	sharp	[ ]

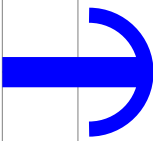
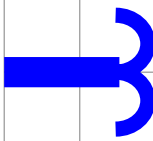
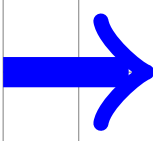
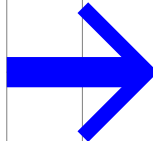
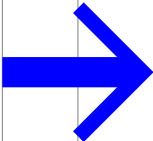
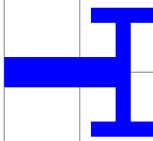
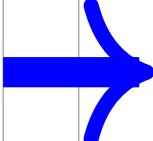
Paramètre line width PGFmanual section : 16-3-7

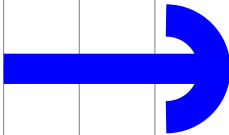
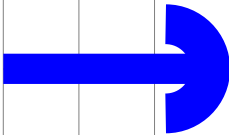
\tikz \draw[-{Arc Barb[line width=.2cm]},line width=.4cm,blue] (0,0) - - (2,0) ;			
			
Arc Barb	Hooks	Classical TikZ Rightarrow	Straight Barb
			
Straight Barb	Tee Bar	Computer Modern Rightarrow	

\tikz \draw[-{Arc Barb[line width=0cm 10]},line width=.1cm,blue] (0,0) - - (3,1) ;	
	
[length=0cm 10]	[length=.5cm 5]
0cm + 10 x .1cm = 1cm	.5cm + 5 x .1cm = 1cm

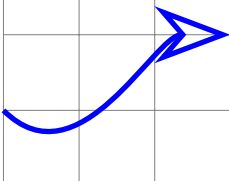
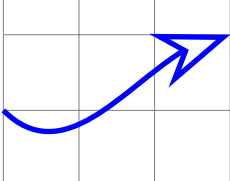
\tikz \draw[-{Arc Barb[length=0cm 5 ]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (3,1)	
	
[length=0cm 5]	[length=0cm 5 .6]
0cm + 5 x (.1cm + 2 mm + .1cm) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm)) = 11 mm

Paramètre line width' PGFmanual section : 16-3-7

\tikz \draw[-{Arc Barb[line width'=.2cm]},line width=.4cm,blue] (0,0) - - (1,1);															
															
Arc Barb				Hooks				Classical TikZ Rightarrow				Straight Barb			
															
Straight Barb				Tee Bar				Computer Modern Rightarrow							

\tikz \draw[-{Arc Barb[line width=0cm 10]},line width'=.1cm,blue] (0,0) - - (3,1);															
															
[length=0cm 10]								[length=.5cm 5]							
0cm + 10 x .1cm = 1cm								.5cm + 5 x .1cm = 1cm							

Paramètre quick PGFmanual section : 16-3-8

\tikz \draw[-{Stealth[length=1cm,open,quick]}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);															
															
[-Stealth[length=1cm,open,quick]]								[-Stealth[length=1cm,open]]							



Paramètre bending PGFmanual section : 16-3-8

Charger l'extension : `\usetikzlibrary{bending}`

<code>\tikz \draw[-{Stealth[length=1cm,open,flex=0}}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);</code>		
flex=0	flex=0.5	flex=1

<code>\tikz \draw[-{Stealth[length=1cm,open,flex'=0}}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);</code>		
flex'=0	flex'=0.5	flex'=1

<code>\tikz \draw[-{Stealth[length=1cm,open,bend}}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);</code>	
<code>[-{Stealth[length=1cm,open,bend}}]</code>	<code>[-Stealth[length=1cm,open,bend]Stealth[length=1cm,open,bend,sep]]</code>

Paramètre cap angle PGFmanual section : 16-5-4


<code>\tikz \draw[-{Fast Round[cap angle=60}},line width=.2cm,blue] (0,0) - - (3,1);</code>		
Fast Round[cap angle=20]	Fast Round[cap angle=60]	Fast Round[cap angle=90]
Fast Triangle[cap angle=20]	Fast Triangle[cap angle=60]	Fast Triangle[cap angle=90]

## 5 Insertion de petites images

### 5.1 Images créées



PGFmanual section : 14-19


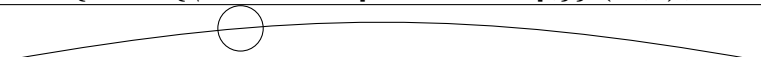
PGFmanual section : 18






Création	Utilisation
<pre>\tikzset{\dfr/.pic={\filldraw[blue] (-2pt,0) rectangle (0,5pt); \filldraw[fill=white] (0,0) rectangle (2pt,5pt); \filldraw[fill=red] (2pt,0) rectangle (4pt,5pt);}}</pre>	<pre>\tikz \pic {dfr};</pre> 


placement à une position	
<code>\pic at (1,1) [<b>pic type</b> = dfr];</code>	<code>\pic at (1,1) {dfr};</code>
<code>\path (1,1) <b>pic</b> [<b>pic type</b>= dfr];</code>	<code>\path (1,1) <b>pic</b> {dfr};</code>
<code>\pic [at={(1,1)}] [<b>pic type</b>= dfr];</code>	<code>\pic [at={(1,1)}] {dfr};</code>


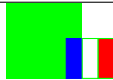
\pic[ <b>scale</b> =3] at (1,1) {dfr};		
<code>[<b>scale</b>=3]</code>	<code>[<b>scale</b>=3,<b>rotate</b>=45]</code>	<code>[<b>scale</b>=3,<b>red</b>]</code>

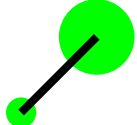
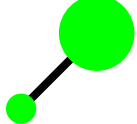
<pre>\tikz [<b>scale</b>=4] \pic at (0,0) {dfr}; \pic at (.5,0) [<b>transform shape</b>] {dfr};</pre>	 
---	---

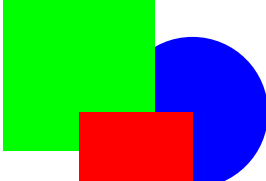
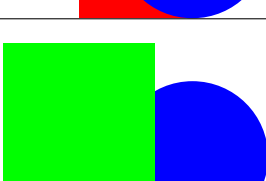
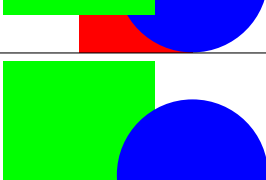
Placement sur un chemin	
<pre>\tikz \draw (0,0) to [out=10,in=170] pic [<b>near start</b>] {dfr} pic {dfr} pic [<b>sloped, near end</b>] {dfr} (10,0);</pre>	
<pre>\draw (0,0) to [out=10,in=170] pic [pos=.3] {<b>code</b>={\draw circle [radius=3mm]};} (10,0);</pre>	

Définition :				
<pre>\tikzset{ my pic/.pic = { \path [pic actions] (0,0) circle[radius=3mm]; \draw (-3mm,-3mm) rectangle (3mm,3mm); } }</pre>				
Utilisation :				
<code>\pic [red] {my pic}</code>				
				
[red]	[draw]	[draw=red]	[draw, shading=ball]	[fill=red !50]

<code>\tikz \pic foreach \x in {1,1.5,...,10} at (\x,0) {dfr} ;</code>


\fill [green] (0,0) - - (1,0)pic [behind path,scale=3] {dfr} - (1,1) - (0,1) - cycle ;	
	
[behind path,scale=3]	[scale=3]

<pre>\tikzset{ pics/mon cercle/.style = { background code = { \fill circle [radius=#1] ; } } } \tikz [fill=green] \draw[line width=3pt] (0,0) pic {mon cercle=2mm} - - (1,1) pic {mon cercle=5mm} ;</pre>	
<pre>\tikzset{ pics/mon cercle/.style = { foreground code = { \fill circle [radius=#1] ; } } } \tikz [fill=green] \draw[line width=3pt] (0,0) pic {mon cercle=2mm} - - (1,1) pic {mon cercle=5mm} ;</pre>	

<pre>\fill [green](-1,0) - - (1,0) pic [pics/background code={\fill[blue] (0.5,0.5) circle (1cm) ;} , pics/code=\fill[red] (-1,-.5) rectangle (0.5,0.5); ] {} - - (1,2) - - (-1,2) - - cycle ;</pre>	
<pre>\fill [green] (-1,0) - - (1,0) pic [pics/foreground code=\fill[blue] (0.5,0.5) circle (1cm) ; ,pics/code={\fill[red] (-1,-.5) rectangle (0.5,0.5); } ] {} - - (1,2) - - (-1,2) - - cycle ;</pre>	
<pre>\fill [green](-1,0) - - (1,0) pic [pics/background code={\fill[blue] (0.5 , 0.5) circle (1cm ) ;} ,pics/code={\fill[red] (-1 , -0.5) rectangle (0.5 , 0.5) ;},behind path ] {} - - (1,2) - - (-1,2) - - cycle ;</pre>	
<pre>\fill [green] (-1,0) - - (1,0) pic [pics/foreground code={\fill[blue] (0.5 , 0.5) circle (1cm) ;} , pics/code={\fill[red] (-1,-.5) rectangle (0.5 , 0.5) ;},behind path ] {} - - (1,2) - - (-1,2) - - cycle ;</pre>	

## 5.2 Images prédéfinies : Marquage des angles

PGFmanual section : 39

Charger l'extension : `\usetikzlibrary{angles}`

<code>\tikz \draw (2,0) coordinate (A) - - (0,0) coordinate (B)</code> <code>- - (1,1) coordinate (C) <b>pic</b> [draw] {angle};</code>	
<code>pic [draw] {angle}</code>	<code>pic [fill] {angle}</code>

<code>\tikz \draw (2,0) coordinate (X) - - (0,0) coordinate (Y)</code> <code>- - (1,1) coordinate (Z) pic [draw] {<b>angle</b>= X- -Y- -Z};</code>	
<code>pic [draw] {angle= X- -Y- -Z}</code>	<code>pic [fill] {angle = Z- -Y- -X}</code>
Par défaut : : <code>angle= A- -B- -C</code>	

<code>\tikz \draw (2,0) coordinate (A) - - (0,0) coordinate (B)</code> <code>- - (1,1) coordinate (C) pic [draw,-&gt;] {angle};</code>	
<code>pic [draw,-&gt;] {angle}</code>	<code>pic [fill,fill=red !50] {angle}</code>

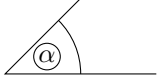
<code>\tikz \draw (2,0) coordinate (A) - - (0,0) coordinate (B)</code> <code>- - (1,1) coordinate (C) pic [draw,<b>angle radius=1cm</b>] {angle};</code>	
<code>pic [draw,<b>angle radius=1cm</b>] {angle}</code>	<code>pic [fill,<b>angle radius=1cm</b>] {angle}</code>
Par défaut : : <code>angle radius=5mm</code>	

Charger l'extension : `\usetikzlibrary{quotes}`

<code>\tikz \draw (3,0) coordinate (A) - - (0,1) coordinate (B) - - (1,2) coordinate (C)</code> <code>pic [draw,"<b>\$\alpha\$</b> "] {angle};</code>	

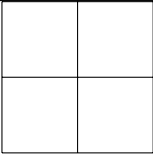
<code>\tikz \draw (2,0) coordinate (A)</code> <code>- - (0,0) coordinate (B) - - (1,2) coordinate (C)</code> <code>pic [draw, " <b>\$\alpha\$</b>", <b>angle eccentricity=1</b>] {angle};</code>
--

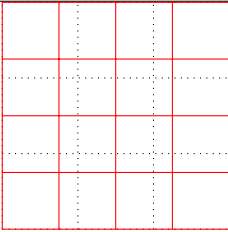
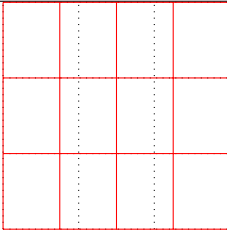
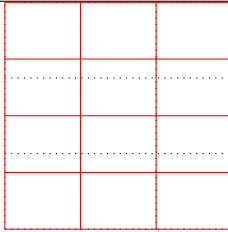
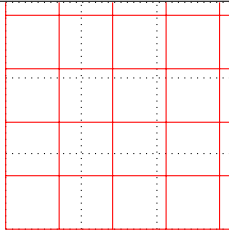
<code><b>angle eccentricity=1</b></code>	<code><b>angle eccentricity=1.5</b></code>
Par défaut : : <code>angle eccentricity= 0.6</code>	

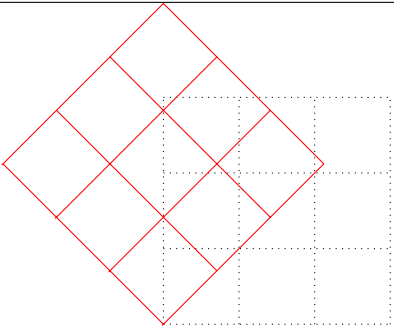
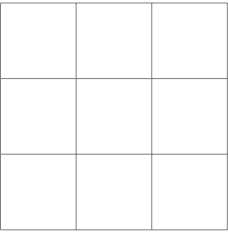
<pre> \tikz { \draw (2,0) coordinate (A) - - (0,0) coordinate (B) - - (1,2) coordinate (C) pic (xxx) [draw,"\$\alpha\$ ",angle radius= 1cm ] {angle}; \draw (xxx)circle [radius=5pt]; } </pre>


## 6 Les coordonnées

### 6.1 Quadrillage


<code>\draw (0,0) <b>grid</b> (2,2);</code> <b>PGFmanual section : 14-8</b>

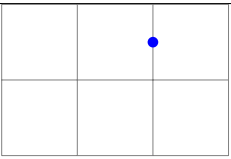
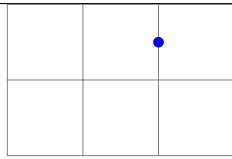
<code>\draw (0,0) grid [<b>step=.75cm</b>] (0,0) grid (3,3);</code>			
			
<b>step=.75cm</b>	<b>x step=.75cm</b>	<b>ystep=.75cm</b>	<b>step=(45 :1)</b>

<code>\draw[red] (0,0) grid [<b>rotate=45</b>] (3,3);</code>	<code>\draw[<b>help lines</b>] (0,0) grid (3,3);</code>
	

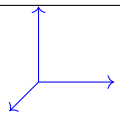
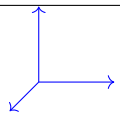
## 6.2 Coordonnées

PGFmanual section : 13-2-1

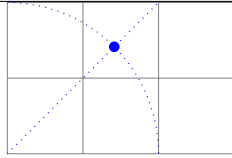
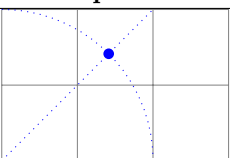
### 6.2.1 Système de coordonnées « canvas »

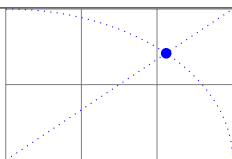
Explicite	Implicite
	
<code>\fill (canvas cs :x=2cm,y=1.5cm) circle (2pt);</code>	<code>\fill (2cm,1.5cm) circle (2pt);</code>

### 6.2.2 Système de coordonnées xyz

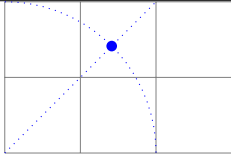
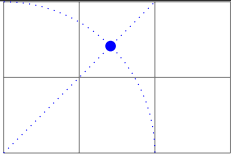
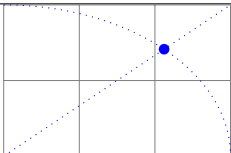
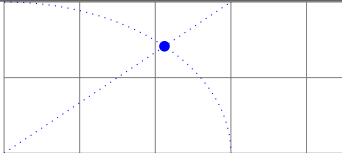
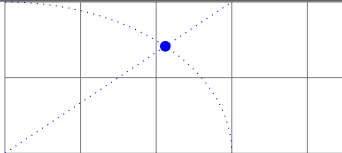
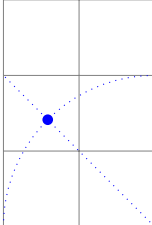
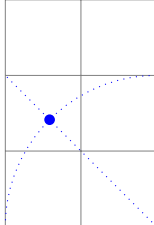
	
<code>\draw (0,0) - - (xyz cs :x=1);</code>	<code>\draw (0,0) - - (1,0,0);</code>
<code>\draw (0,0) - - (xyz cs :y=1);</code>	<code>\draw (0,0) - - (0,1,0);</code>
<code>\draw (0,0) - - (xyz cs :z=1);</code>	<code>\draw (0,0) - - (0,0,1);</code>

### 6.2.3 Système de coordonnées polaire « canvas »

Explicite	Implicite
	
<code>\fill (canvas polar cs :angle=45,radius=2cm) circle (2pt);</code>	<code>\fill (45 :2cm) circle (2pt);</code>

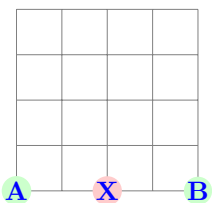
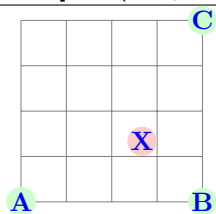
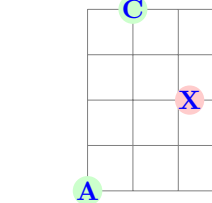
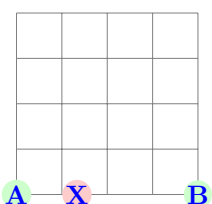
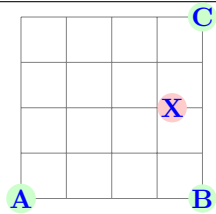
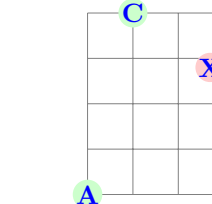

<code>\fill (canvas polar cs :angle=45,x radius=3cm,y radius=2cm) circle (2pt);</code>

### 6.2.4 Coordinate system xyz polar

Explicite	Implicite
	
<code>\fill (xyz polar cs :angle=45,radius=2) circle (2pt);</code>	<code>\fill (45 :2cm) circle (2pt);</code>
	
<code>\fill (xyz polar cs :angle=45,x radius=3,y radius=2) circle (2pt);</code>	
<code>\begin{tikzpicture}[x=1.5cm,y=1cm]</code>	
	
<code>\fill (xyz polar cs :angle=45,radius=2) circle (2pt);</code>	<code>\fill (45 :2cm) circle (2pt);</code>
<code>\begin{tikzpicture}[x={(0cm,1cm)},y={(-1cm,0cm)}]</code>	
	
<code>\fill (xyz polar cs :angle=45,radius=2) circle (2pt);</code>	<code>\fill (45 :2cm) circle (2pt);</code>

### 6.2.5 Coordonnées barycentriques

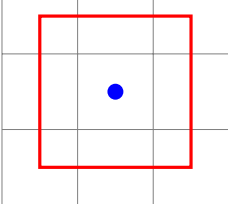
[PGFmanual section : 13-2-2](#)

<code>\node [circle,fill=red !20] at (barycentric cs :A=0.6,B=0.3 ) {X};</code>		
		
A=0.3,B=0.3	A=0.4,B=0.4,C=.4	A=0.5,B=0.5,C=.5,D=.5
		
A=0.6,B=0.3	A=0.2,B=0.4,C=.6	A=0.2,B=0.4,C=.6,D=.8



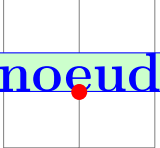
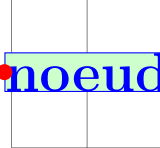
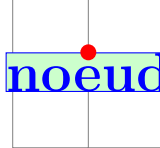
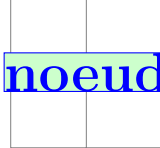
## 6.2.6 Coordonnées nominatives : noeud

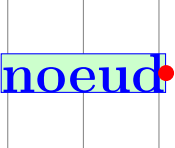
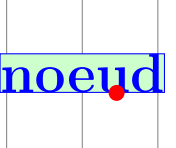
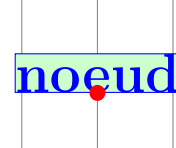
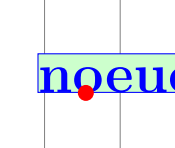
[PGFmanual section : 13-2-3](#)

	<pre>\coordinate (centre) at(1.5,1.5); \coordinate (A) at (.5,.5); \coordinate (B) at (2.5,2.5);  \fill (centre) circle (3pt); \draw[red] (A) rectangle (B);</pre>
---	--

voir aussi page 88

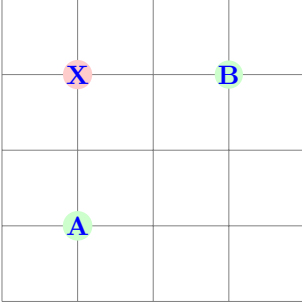
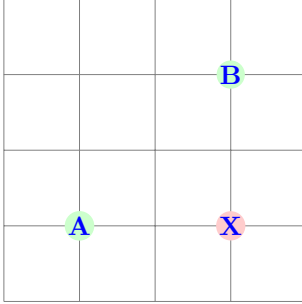
## 6.2.7 Coordonnées relatives à un noeud

<pre>\node [draw,fill=green!20,] (A) at (1,1) {\huge noeud}; \fill[red] (node cs :name=A,anchor=south) circle (3pt);</pre>			
			
name=A,anchor=south	name=A,anchor=west	name=A,anchor=north	name=A,anchor=east

<pre>\fill[red] (node cs :name=A,angle=0) circle (3pt);</pre>			
			
name=A,angle=0	name=A,angle=-30	name=A,angle=-90	name=A,angle=-150

## 6.2.8 Coordonnées relatives à deux points

[PGFmanual section : 13-3-1](#)

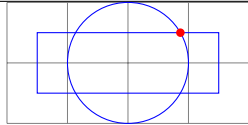
<pre>\node [circle,fill=red!20] at (1,1  - 3,3) {X}</pre>	
	
at (1,1  - 3,3)	at (1,1 -  3,3)

## 6.2.9 Coordonnée relative à une intersection

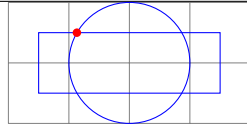
[PGFmanual section : 13-3-2](#)

Charger l'extension : `\usetikzlibrary{intersections}`

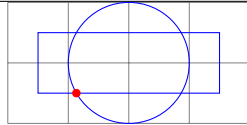
```
\draw [name path=cercle] (2,1) circle (1cm);
\draw [name path=rectangle] (0.5,0.5) rectangle +(3,1);
\fill [red,name intersections={of=cercle and rectangle}] (intersection-1) circle (2pt)
```



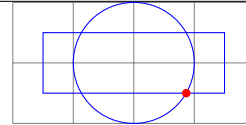
intersection-1



intersection-2

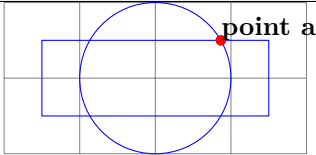


intersection-3

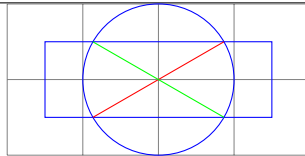


intersection-4

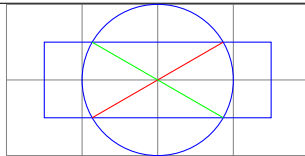
```
\fill [red, name intersections={of=cercle and rectangle}]
(intersection-1) circle (2pt) node[black,above right] {point a};
```



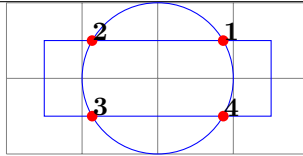
```
\fill [red, name intersections={of=cercle and rectangle, name=point}];
\draw [red] (point-1) - - (point-3); \draw [green] (point-2) - - (point-4);
```



```
\fill [red, name intersections={of=cercle and rectangle, by={a,b,c,d}}];
\draw [red] (a) - - (c); \draw [green] (b) - - (d);
```



```
\fill [name intersections={of=cercle and rectangle, name=i, total=\t}] [red]
\foreach \s in {1,...,\t} {(i-\s) circle (2pt) node[black,above right] {\s}}
```

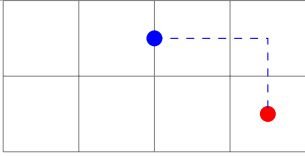


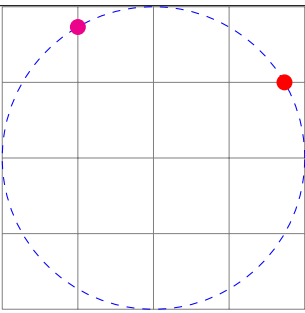
## 6.3 Position calculée

### 6.3.1 Position calculée avec le module « pgfmath »

[PGFmanual section : 13-2-1](#)

Ce module est chargé automatiquement avec le module Tikz

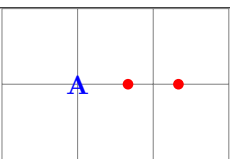

<i>Explicite</i> : <code>\fill [red] (<b>canvas cs</b> :x=2cm+1.5cm,y=1.5cm-1cm) circle (3pt);</code>
<i>Implicite</i> : <code>\fill [red] (<b>2cm+1.5cm,1.5cm-1cm</b>) circle (3pt);</code>

	<pre> \draw[dashed] (2,2) circle (2); \fill [red](2+ 2*cos 30 , 2+2*sin 30) circle (3pt); \fill[magenta]      (2+2*cos{(120)}      , 2+2*sin{(120)}) circle (3pt); </pre>
---	---

## 6.4 Position calculée avec « library calc »

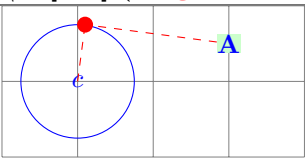
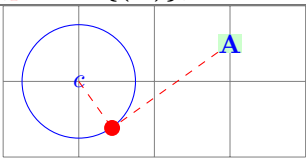
[PGFmanual section : 13-5](#)

Charger l'extension : `\usetikzlibrary{calc}`

	<pre> \node (a) at (1,1) {A}; \fill [red] (\$(a) + 2/3*(1cm,0)\$) circle (2pt); \fill [red] (\$(a) + 4/3*(1cm,0)\$) circle (2pt); </pre>
---	--

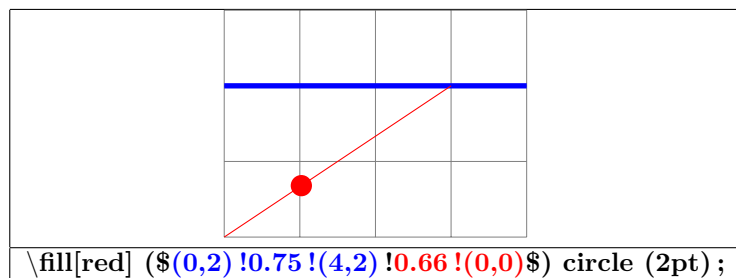
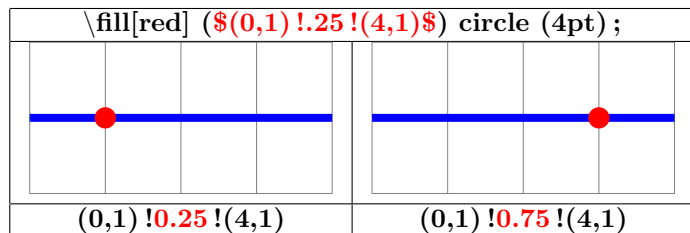
## 6.5 Tangentes avec « library calc »

[PGFmanual section : 13-2-4](#)

<pre> \node[fill=green!20] (a) at (3,1.5) {A}; \fill[red] (<b>tangent cs</b> :node=c,<b>point</b>={(A)},<b>solution</b>=1); </pre>	
	
<b>solution=1</b>	<b>solution=2</b>

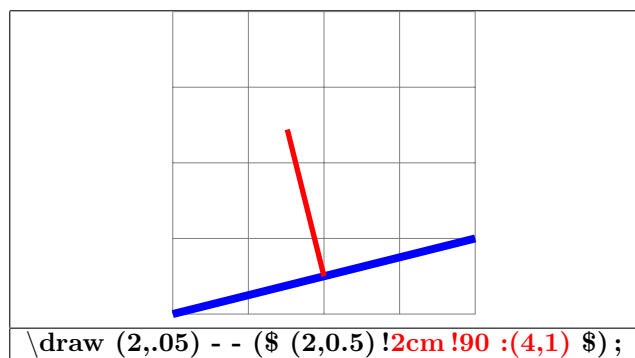
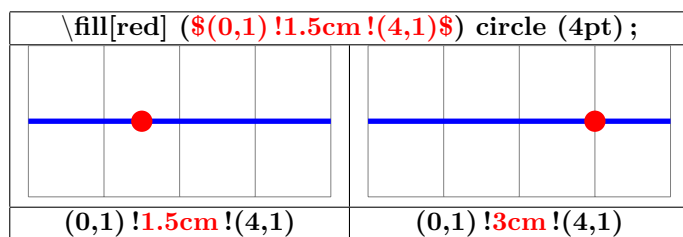
### 6.5.1 Point à pourcentage donné

[PGFmanual section : 13-5-3](#)



### 6.5.2 Point à distance donnée

[PGFmanual section : 13-5-4](#)



### 6.5.3 Coordonnées relatives

### 6.5.4 Cartésienne

[PGFmanual section : 13-4-1](#)

relative à l'origine	relative à une position	relative à la dernière position
<code>(0,0) - - (1,0)</code> <code>- - (2,1) - - (2,-1)</code>	<code>(0,0) - - (1,0)</code> <code>- - +(2,1) - - +(2,-1)</code>	<code>(0,0) - - (1,0)</code> <code>- - ++(2,1) - - ++(2,-1)</code>

<code>\draw (0,0) rectangle (1,1)</code> <code>rectangle (2,2) rectangle (3,3);</code>	<code>\draw (0,0) rectangle (1,1)</code> <code>rectangle +(2,2) rectangle +(3,3);</code>	<code>\draw (0,0) rectangle (1,1)</code> <code>rectangle ++(2,2) rectangle ++(3,3);</code>

### 6.5.5 Polaire

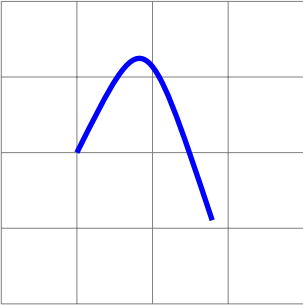
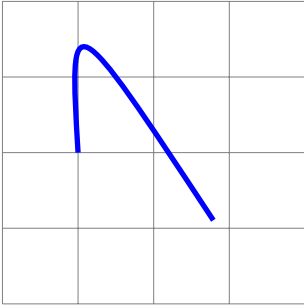
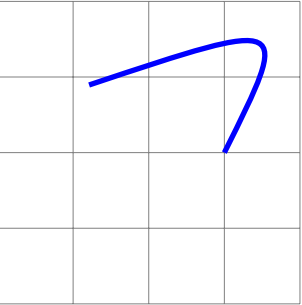
relative à l'origine	relative à une position	relative à la dernière position
<code>(0:0) - - (0:1)</code> <code>- - (30:2) - - (-30:2)</code>	<code>(0:0) - - (0:1)</code> <code>- - +(30:2) - - +(-30:2)</code>	<code>(0:0) - - (0:1)</code> <code>- - ++(30:2) - - ++(-30:2)</code>

### 6.5.6 coordonnée relative en polaire

[PGFmanual section : 13-4-2](#)

<code>([turn]-45:1cm)</code>	<code>([turn]45:1cm)</code>

<code>\draw (4,0) arc (0:120:2) - - ([turn]90:2cm);</code>	<code>\draw (0,0) to [bend left] (2,2) - - ([turn]0:2cm);</code>

\draw(1,2) .. controls ([turn]0 :2cm) .. ([turn]-90 :2cm);		
		
([turn]0 :2cm) .. ([turn]-90 :2cm)	([turn]30 :2cm) .. ([turn]-90 :2cm)	([turn]0 :2cm) .. ([turn]90 :2cm)

## 7 Les nœuds

### 7.1 Définition des nœuds

\draw (1,1) node[fill=red !20] {};			
Par défaut :	node[draw]	node[red]	node[red,draw]

\node at (1,1) [fill=red !20] {};			
[fill=red !20]	[draw]	[red,fill=red !20]	[red,draw]

Autres types de nœuds voir page 73

### 7.2 Liaisons

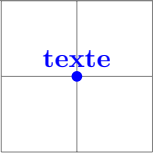
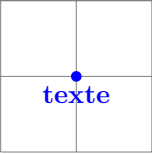
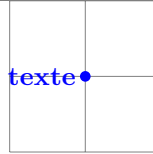
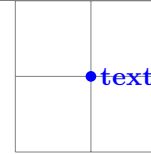
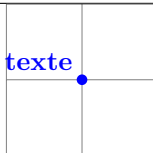
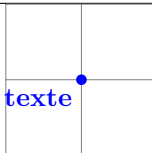
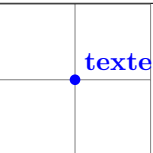
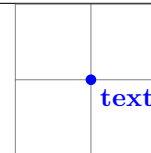
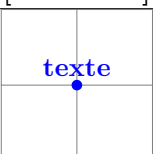
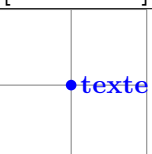
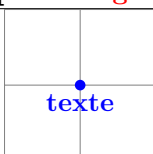
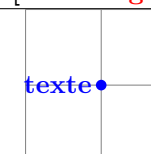
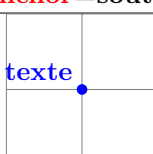
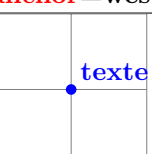
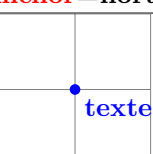
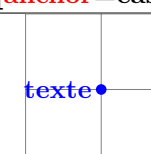
(A) - - (B)	(A)   - (B)	(A) -   (B)
(A) to [bend right] (B)	(A) to [bend left] (B)	(A) to [bend left=0] (B)
(A) to [bend left=120] (B)	(A) to [bend left=45] (B)	(A) to [bend left=90] (B)
(A) to [out=90] (B)	(A) to [out=30] (B)	(A) to [in=-90] (B)

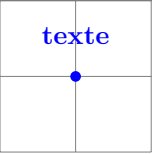
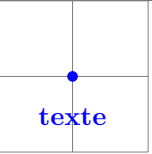
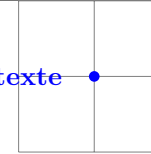
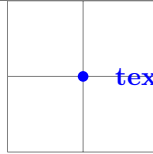
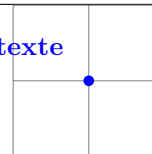
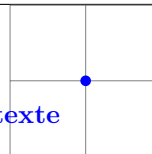
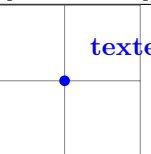
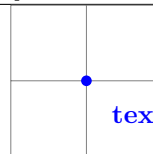
\draw (A) .. controls +(right :2cm) and +(down :2cm) .. (B);	
controls +(right :2cm) and +(down :2cm)	controls +(up :1cm) and +(left :1cm)
controls +(right :1cm) and +(right :2cm)	controls +(up :1cm) and +(right :2cm)
controls +(120 :2cm) and +(200 :1cm)	controls +(120 :2cm) and +(200 :1cm)
controls +(C) and +(D)	controls +(D)

\node[draw] (A) at (0,0) {A} \node[draw] (B) at (2,2) {B} <b>edge</b> [->] (A);		
<div>PGFmanual section : 17-12-1</div>		
[->]	[red]	[dashed]

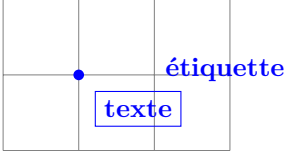





### 7.3 Étiquettes sur les nœuds


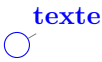
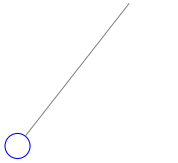
\fill(0,0) circle (2pt) node[above]{texte};			
			
[above]	[below]	[left]	[right]
			
[above left]	[below left]	[above right]	[below right]
			
[anchor=south]	[anchor=west]	[anchor=north]	[anchor=east]
			
[anchor=south east]	[anchor=south west]	[anchor=north west]	[anchor=north east]

\fill(0,0) circle (2pt) node[above=.3cm]{texte};			
			
[above=.3cm]	[below=.3cm]	[left=.3cm]	[right=.3cm]
			
[above left=.3cm]	[below left=.3cm]	[above right=.3cm]	[below right=.3cm]

$\backslash\text{shorthandoff}\{ : \}$ <sup>1</sup> $\backslash\text{node} [\text{draw}, \text{label}=\text{right} : \text{texte}] \{ \}$ $\backslash\text{shorthandon}\{ : \}$				
$\square$ texte	texte $\square$	texte $\square$	$\square$ texte	texte $\square$
label=right	label=left	label=above	label=below	label=45

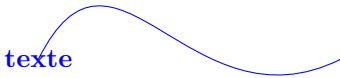
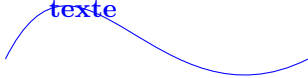
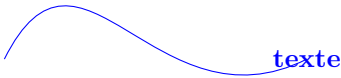
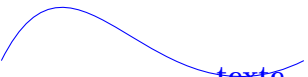
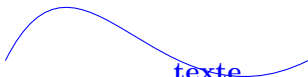

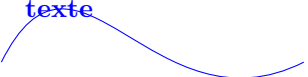
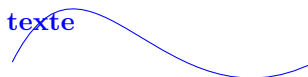
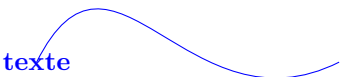
$\backslash\text{fill}(0,0)$ circle (2pt) node[below right=.3cm,draw,label=45 :étiquette] {texte};				
				




$\backslash\text{shorthandoff}\{ : \}$ $\backslash\text{node}[\text{circle},\text{draw},\text{blue},\text{pin}=\text{texte}] \{ \}$ ; $\backslash\text{shorthandon}\{ : \}$ <sup>1</sup>		
		
[circle,pin=texte]	[circle,pin=60 :texte]	[circle,pin=right :texte]




$\backslash\text{tikz}[\text{pin position}=60]$ $\backslash\text{node} [\text{circle},\text{pin}=\text{texte}] \{ \}$ ;		
		
[pin position=60]	[pin distance=0 cm]	[pin distance=2 cm]
Par défaut : : above	Par défaut : : 3 ex	

<sup>1</sup>désactivation et ré-activation de « : »conflit entre les modules Tikz et Babel en français

## 7.4 Nœuds sur un chemin

\draw(0,0) .. controls (1,2) and (2,-1) .. (4,0) node[at end] {texte} ;		
		
pos=0	pos=.33	at end (pos=1)
		
very near end (pos=0.875.)	near end (pos=0.75)	midway (pos=0.5)
		
near start (pos=0.25)	very near start (pos=0.125)	at start (pos=0)

\draw(0,0) .. controls (1,2) and (2,1) .. (4,0) node[sloped,midway] {texte} ;		
		
sloped	above	below

\draw(0,0) .. controls (1,2) and (2,1) .. (5,0) node[sloped,midway,allow upside down] {texte} ;		
		
sloped	above	below

\draw(A) to [bend right] node [bend right] {texte} (B);		
[bend right]	[auto,bend right]	[auto,swap,bend right]

## 7.5 Nœuds sur un “edge”

\draw(0,0) edge ["abc", ->] (4,0);		
PGFmanual section : 17-12-2		
["abc", ->]	["abc", near start]	["abc", style={auto=right}]
[font=\Large,"abc" ]	["abc" color=red ]	["abc" ' ]
["abc" draw ]	["abc" inner sep=0pt ]	["abc" fill ,fill=yellow ]

\draw[every edge quotes/.style={fill=yellow}] (0,0) edge ["abc"] (4,0);

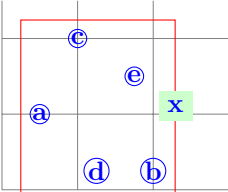
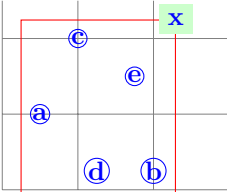
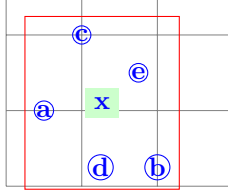
## 7.6 Nœud enveloppant

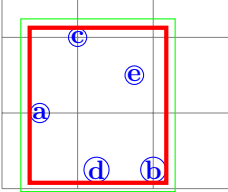
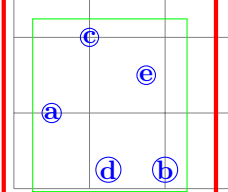
Charger l'extension: \usetikzlibrary{fit}

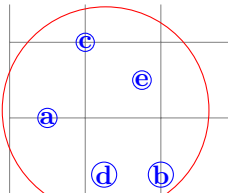
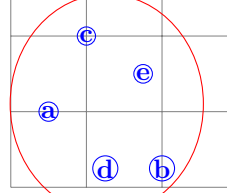
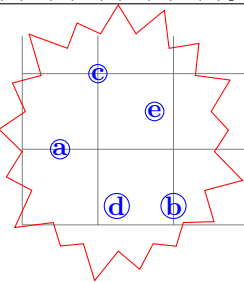
PGFmanual section : 52

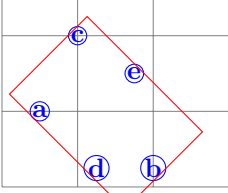
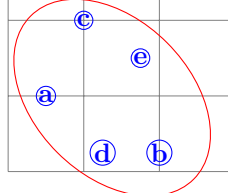
	\fill (.5,1) circle (3pt); \fill (2,.25) circle (3pt); \fill (1,2) circle (3pt); \fill (1.25,0.25) circle (3pt); \fill (1.75,1.5) circle (3pt); \node[draw=red,ultra thick,fit={(.5,1) (2,.25) (1,2) (1.25,0.25) (1.75,1.5) }] {} ;
--	--

	[dot/.style={inner sep=0pt,draw,circle,blue}] \node[dot] (a) at (.5,1) {a}; \node[dot] (b) at (2,.25) {b}; \node[dot] (c) at (1,2) {c}; \node[dot] (d) at (1.25,0.25) {d}; \node[dot] (e) at (1.75,1.5) {e}; \node[draw=red,ultra thick,fit=(a) (b) (c) (d) (e)] {}
--	---

<pre>\node[draw=red,ultra thick,fit=(a) (b) (c) (d) (e)] (xxx) {} \node at (xxx.east) [fill=green!20] {x};</pre>		
		
xxx.east	xxx.north east	xxx.center

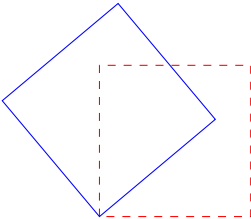
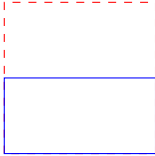
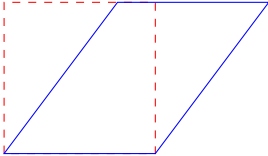
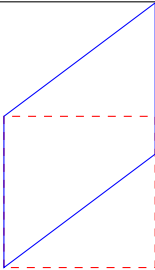
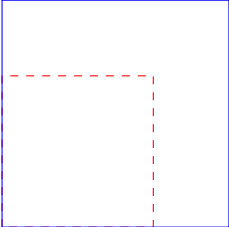
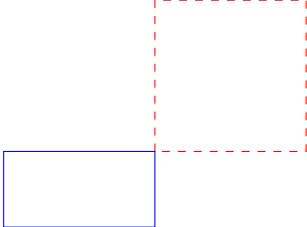
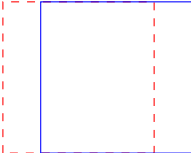
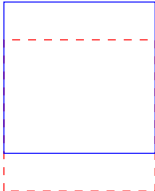
<pre>\node [draw=green,fit=(a) (b) (c) (d) (e)] ; \node [inner sep=0pt,draw=red,fit=(a) (b) (c) (d) (e)] ;</pre>	
	
inner sep=0pt	inner sep=.5cm

<pre>\node[circle,draw=red,inner sep=0pt,fit=(a) (b) (c) (d) (e)] {};</pre>		
		
circle	ellipse	shape=starburst (voir section 17 )

<pre>\node[draw=red, rotate fit=45, fit=(a) (b) (c) (d) (e)] {};</pre>	
	
rotate fit=45	ellipse, rotate fit=45

## 8 Constructions particulières

PGFmanual section : 25-3

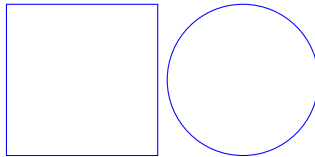
\draw[rotate,blue] (0,0) rectangle (2,2) ;			
			
<b>rotate=40</b>	<b>x=1cm,y=0.5cm</b>	<b>xslant=0.75</b>	<b>yslant=0.75</b>
			
<b>scale=1.5</b>	<b>scale=-1</b>	<b>xshift=0.5cm</b>	<b>yshift=0.5cm</b>

## 9 Placer son dessin

### 9.1 Dans le texte

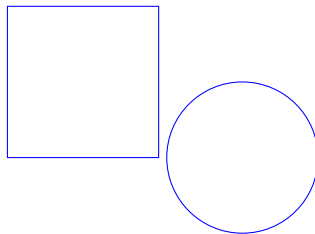
#### 9.1.1 Sans option de décalage

PGFmanual section : 12-2



dessin directement dans le texte : `\tikz \draw (0,0) rectangle(2,2);\tikz \draw (0,0) circle (1);` ici est inclus le code suivant

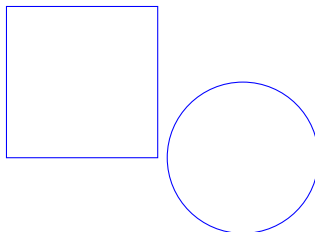
#### 9.1.2 Avec décalage nul



dessin directement dans le texte : `\tikz[baseline=0pt] \draw (0,0) rectangle(2,2);\tikz[baseline=0pt] \draw (0,0) circle (1);` ici est inclus le code suivant :

`\tikz[baseline=0pt] \draw (0,0) rectangle(2,2);\tikz[baseline=0pt] \draw (0,0) circle (1);`

#### 9.1.3 Avec décalage

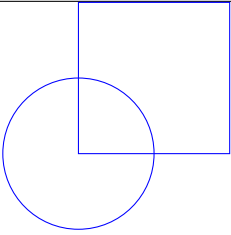
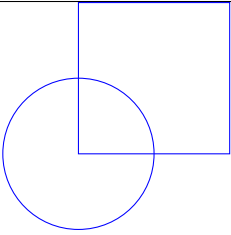
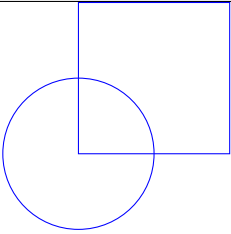


dessin directement dans le texte : `\tikz[baseline=1cm] \draw (0,0) rectangle(2,2);\tikz[baseline=1cm] \draw (0,0) circle (1);` ici est inclus le code suivant

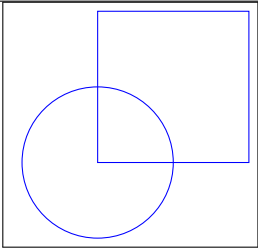
`\tikz[baseline=1cm] \draw (0,0) rectangle(2,2);\tikz[baseline=1cm] \draw (0,0) circle (1);`

9.2 Dans un environnement tikzpicture

PGFmanual section : 12-1

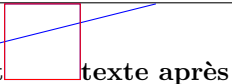
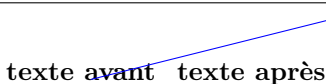
	<pre>texte avant \begin{tikzpicture}[blue] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après</pre>
	<pre>texte avant \begin{tikzpicture}[blue,baseline=0pt] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après</pre>
	<pre>texte avant \begin{tikzpicture}[blue,baseline=1cm] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après</pre>

9.3 Dans un environnement fbox

	<pre>texte avant \fbbox{ \begin{tikzpicture}[blue,baseline=0pt] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} } texte après</pre>
---	---

9.4 Modification du cadrage

PGFmanual section : 15-8

<pre>\draw [use as bounding box] (1,0) rectangle (2,1); \draw[blue] (-1,0) - - (3,1);</pre>	
	
<pre>(1,0) rectangle (2,1)</pre>	<pre>(0,0) rectangle (0,0)</pre>



<pre> texte avant. \begin{tikzpicture} [trim left=1cm] \draw[blue] (-1,0) -- (3,1); \draw[red] (0,0) grid (2,1); \end{tikzpicture}texte après </pre>	
<pre> texte avant. [trim left=1cm] </pre>	<pre> texte avant. [trim right= 1cm] </pre>

<pre> texte avant \begin{tikzpicture}[blue] \draw [red,use as bounding box] (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>	<pre> texte avant \begin{tikzpicture}[blue,baseline=0pt] \draw [red,use as bounding box] (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>
---	--

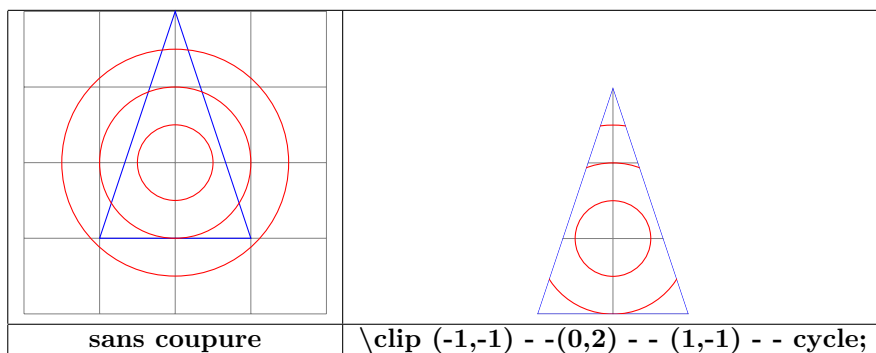
<pre> texte avant \begin{tikzpicture}[blue,baseline=0pt] \draw [red,use as bounding box] (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>	<pre> texte avant \begin{tikzpicture}[blue,baseline=0pt] \useasboundingbox (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>
--	--

<pre> texte avant \begin{tikzpicture}[blue,baseline=0pt] \useasboundingbox (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>	<pre> texte avant \begin{tikzpicture}[blue,baseline=0pt] \useasboundingbox (-1.5,-1.5) rectangle (2.5,2.5); \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} texte après </pre>
--	--

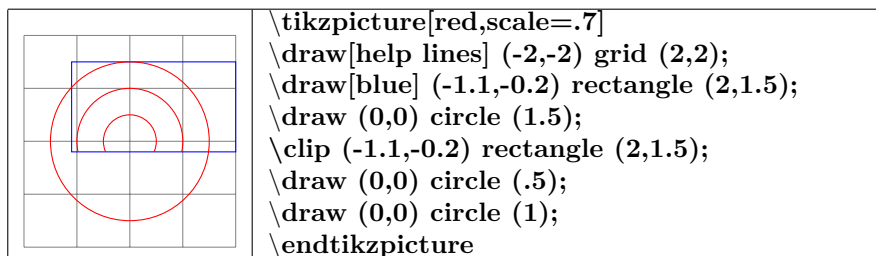
<pre> \begin{tikzpicture}[blue] \fill (0,0) circle (5pt); \fill (2,1) circle (5pt); \draw[red] (current bounding box.south west) rectangle (current bounding box.north east); \end{tikzpicture} </pre>	
--	--

## 9.5 Coupure de l'image

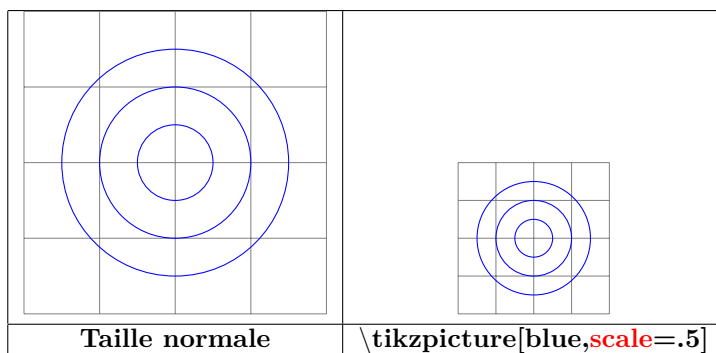
PGFmanual section : 15-9



## 9.6 Rognage partiel



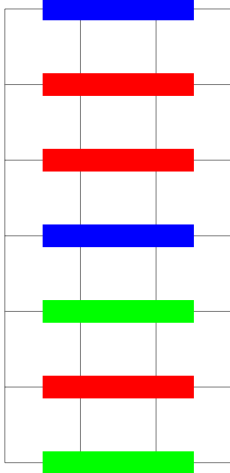
### 9.6.1 Changement d'échelle



## 10 Scope

### 10.1 Environnement Scope

PGFmanual section : 12-3

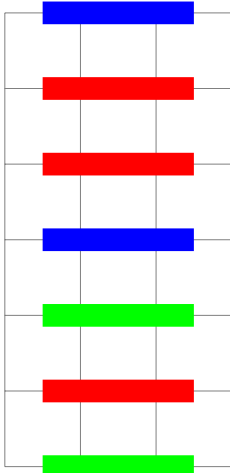
<pre> \begin{tikzpicture}[line width = 3mm]  \draw (0.5,6) - - (2.5,6);  \begin{scope}[red] \draw (0.5,5) - - (2.5,5); \draw (0.5,4) - - (2.5,4); \end{scope}  \draw (0.5,3) - - (2.5,3);  \begin{scope}[green] \draw (0.5,2) - - (2.5,2); \draw [red] (0.5,1) - - (2.5,1); \draw (0.5,0) - - (2.5,0); \end{scope}  \end{tikzpicture} </pre>	
--	--

### 10.2 library scopes

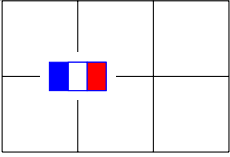
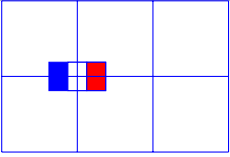
#### 10.2.1 Simplification d'un environnement scope

PGFmanual section : 12-3-2

Charger l'extension: `\usetikzlibrary{scopes}`

<pre> \begin{tikzpicture}[line width = 3mm]  \draw (0.5,6) - - (2.5,6);  { [red] \draw (0.5,5) - - (2.5,5); \draw (0.5,4) - - (2.5,4); }  \draw (0.5,3) - - (2.5,3);  { [green] \draw (0.5,2) - - (2.5,2); \draw [red] (0.5,1) - - (2.5,1); \draw (0.5,0) - - (2.5,0); }  \end{tikzpicture} </pre>	
--	--

### 10.2.2 Portée d'un seul élément

	
<pre>\node [fill=white] at (1,1) {\DFR}; \scoped [on background layer] \draw (0,0) grid (3,2);</pre>	<pre>\node [fill=white] at (1,1) {\DFR};  \draw (0,0) grid (3,2);</pre>

North west

North

North east

## 11 Position absolue sur une page

```
\begin{tikzpicture}[remember picture,overlay]
\fill(current page.north) circle (5pt) node[below left=4mm] \Huge north ;
\fill(current page.north east) circle (5pt) node[below left=4mm] \Huge north east ;
\fill(current page.north west) circle (5pt) node[below right=4mm] \Huge north west ;
\fill(current page.east) circle (5pt) node[above left=4mm] \Huge east ;
\fill(current page.center) circle (5pt) node[above left=4mm] \Huge center ;
\fill(current page.west) circle (5pt) node[above right=4mm] \Huge west ;
\fill(current page.south) circle (5pt) node[above right=4mm] \Huge south ;
\fill(current page.south west) circle (5pt) node[above right=4mm] \Huge south west ;
\fill(current page.south east) circle (5pt) node[above left=4mm] \Huge south east ;
\end{tikzpicture}
```

```
\begin{tikzpicture}[remember picture,overlay]
\node [opacity=.15] at (current page.center) {\includegraphics[width=8cm]{tiger} };
\end{tikzpicture}
```

```
\begin{tikzpicture}[remember picture,overlay]
\draw[dotted,opacity=.4] (current page.south west) -- (current page.north east)
node[near start] {\Huge TIKZ} ;
\end{tikzpicture}
```

West

center

East

TIKZ

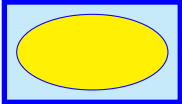
South west

South

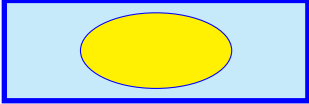
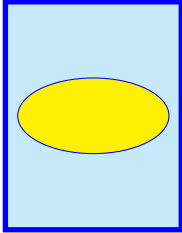
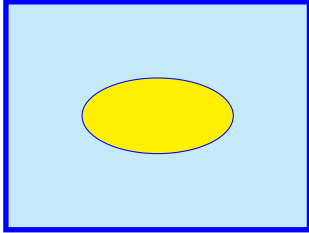
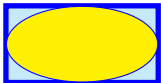
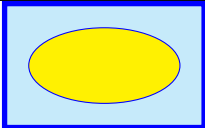
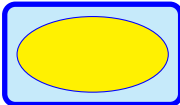
South east

## 12 Arrière plan du dessin

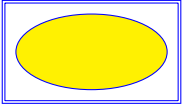
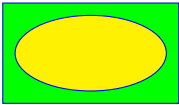
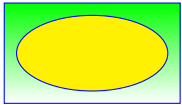
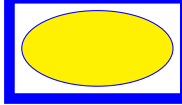
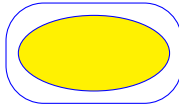
### 12.1 Encadrement

	<sup>1</sup> <pre>\begin{tikzpicture}[show background rectangle] \filldraw[fill=yellow] (0,0) ellipse (1 and .5 ); \end{tikzpicture}</pre> <p><i>Autre syntaxe :</i>  <pre>\begin{tikzpicture}[framed]</pre></p>
---	---

#### 12.1.1 Options

[show background rectangle,inner frame xsep=1cm]		
		
inner frame xsep=1cm	inner frame ysep=1cm	inner frame sep=1cm
Par défaut : : inner frame xsep=1ex , inner frame ysep=1ex		
		
tight background (inner frame sep = 0pt)	loose background (inner frame sep = 2ex)	rounded corners

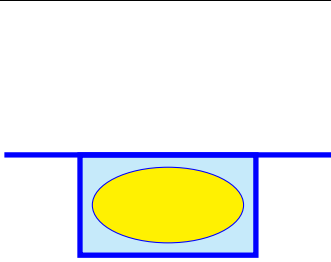
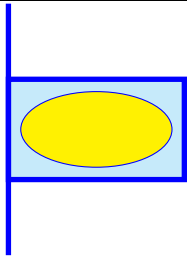
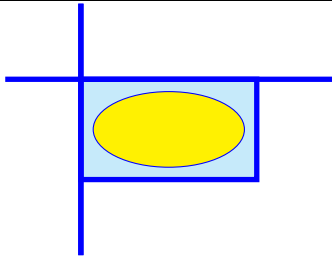
#### 12.1.2 Style

[background rectangle/.style={double,draw=blue},framed]				
				
double	fill=green	top color=green	line width=4pt	rounded corners=0.5cm

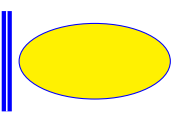
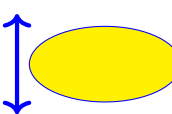
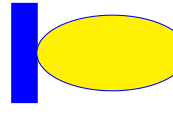
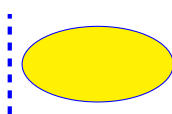
### 12.2 Encadrement partiel

			
show background top	show background bottom	show background left	show background right

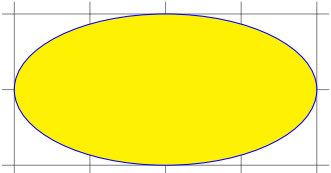
<sup>1</sup>\tikzset{background rectangle/.style={fill=cyan!20,draw=blue,line width=2pt}}

[framed,show background top,outer frame xsep=1cm]		
		
outer frame xsep=1cm	outer frame ysep=1cm	outer frame sep=1cm

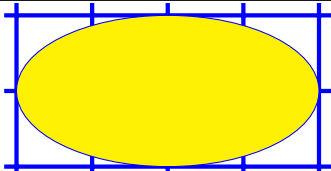
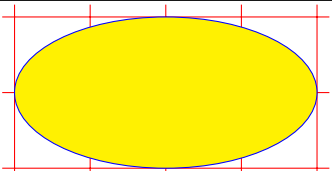
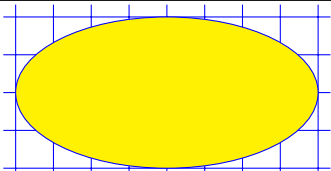
### 12.2.1 Style

\begin{tikzpicture}[show background left, [background left/.style={double,ultra thick,draw=blue}]]			
			
double	<->	line width=10pt	dashed

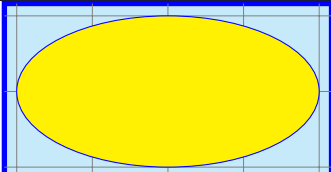
### 12.2.2 Quadrillage

	<pre>\begin{tikzpicture}[show background grid] \filldraw[fill=yellow] (0,0) ellipse (2 and 1); \end{tikzpicture}</pre> <p><i>Autre syntaxe :</i>  <pre>\begin{tikzpicture}[gridded]</pre></p>
--	---

### 12.2.3 Style

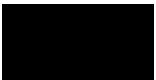






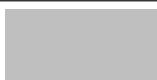









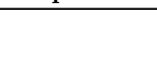

[background grid/.style={ultra thick,draw=blue},show background grid]		
		
ultra thick ,draw=blue,draw=blue	draw=red	step=.5cm,draw=blue






### 12.2.4 Encadrement et quadrillage

	<pre>\begin{tikzpicture}[framed , gridded ] \filldraw[fill=yellow] (0,0) ellipse (2 and 1); \end{tikzpicture}</pre>
---	---

## 13 Créer ses couleurs

### 13.1 Couleurs de base

				
black	blue	brown	cyan	darkgray
				
gray	green	lightgray	lime	magenta
				
olive	orange	pink	purple	red
				
teal	violet	white	yellow	

				
[blue!10]	[blue!30]	[blue!50]	[blue!70]	[blue!90]


### 13.2 Mélange de couleurs

			
[blue!30!red]	[red!80!blue!20]	[red!80!blue!50]	[red!80!blue!50!black!40]



### 13.3 Créer son nom de couleur

[PGFmanual section : 15-2](#)

#### 13.3.1 A pourcentage de rouge vert et bleue

	<pre>\definecolor{<b>macouleur</b>}{rgb}{.75,0.5,0.25}</pre> <p>(75% de rouge 50% de vert 25% de bleu)</p> <pre>\fill [<b>macouleur</b>] (0,0) rectangle (2,1);</pre>
---	---

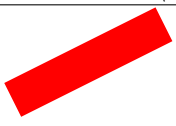
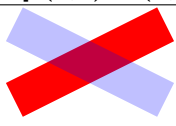
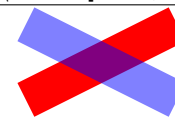
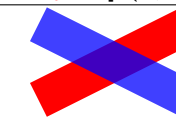
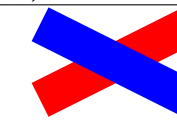
#### 13.3.2 A partir d'une couleur existante

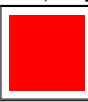

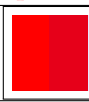





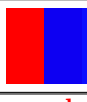



	<pre>\colorlet{<b>monrouge</b>}{red!25}</pre> <pre>\fill [<b>monrouge</b>] (0,0) rectangle (2,1);</pre>
	<pre>\colorlet{<b>monviolet</b>}{red!25!blue}</pre> <pre>\fill [<b>monviolet</b>] (0,0) rectangle (2,1);</pre>








## 14 Opacité

PGFmanual section : 23-2

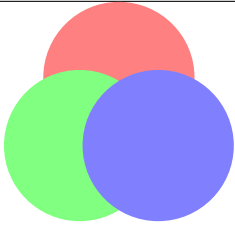
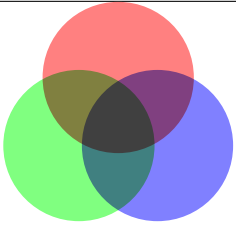
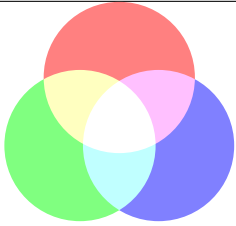
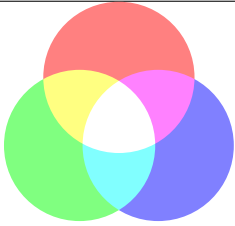
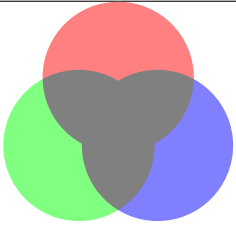
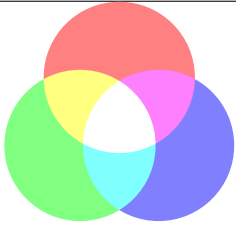
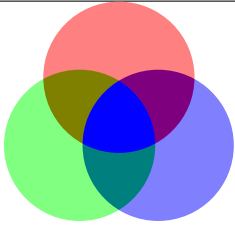
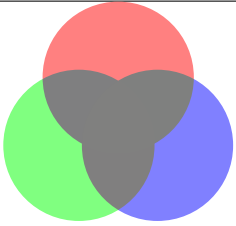
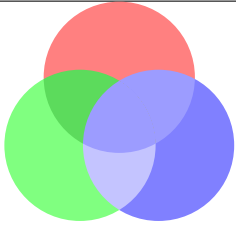
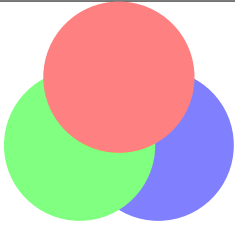
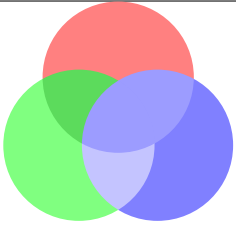
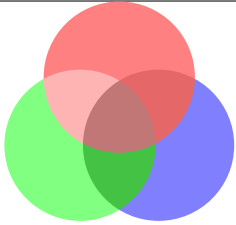
<code>\draw[red] (0,0) – (2,1);</code>		<code>\draw [blue,draw opacity=0] (0,1) - - (2,0);</code>		
				
draw opacity=0		draw opacity=0.25	draw opacity=0.5	draw opacity=0.75
draw opacity=1				

<code>\fill[red] (0,0) rectangle (1,1);</code>		<code>\fill[blue,transparent] (0.5,0) rectangle (1.5,1);</code>	
			
transparent	ultra nearly transparent	very nearly transparent	nearly transparent
			
semitransparent	nearly opaque	very nearly opaque	ultra nearly opaque
			
opaque	fill opacity=.25	fill opacity=.5	fill opacity=.75

<code>\node at (1,1) [text opacity=1] { \Huge texte} ;</code>				
				
text opacity=1	text opacity=0.75	text opacity=0.5	opacity=0.25	text opacity=0

## 14.1 Blend Modes

PGFmanual section : 23-3

		
blend group=normal	blend group=multiply	blend group=screen
		
blend group=overlay	blend group=darken	blend group=lighten
		
blend group=difference	blend group=exclusion	blend group=hue
		
blend group=saturation	blend group=color	blend group=luminosity

A revoir message d'erreur Unknow blend mode !			
blend group=colordodge	blend group=colorburn	blend group=hardlight	blend group=softlight

## 14.2 Fading

Charger l'extension: `\usetikzlibrary{fadings}`

### 14.2.1 Modèles prédéfinis

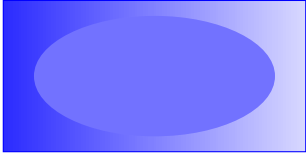

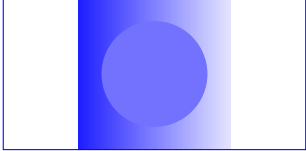

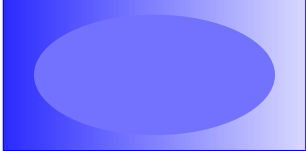



PGFmanual section : 51

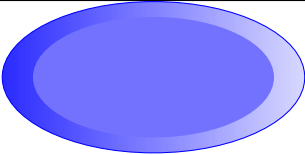
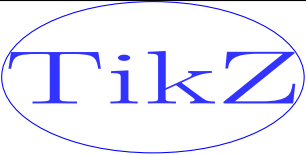
<code>\fill [blue,path fading=north] (-1,-1) rectangle (1,1);</code>			
path fading=north	path fading=south	path fading=east	path fading=west
path fading=circle with fuzzy edge 10 percent		path fading=circle with fuzzy edge 15 percent	
path fading=circle with fuzzy edge 20 percent		path fading=fuzzy ring 15 percent	

### 14.2.2 Création de décoloration avec tikzfadingfrompicture

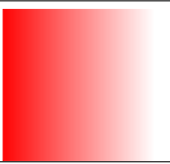
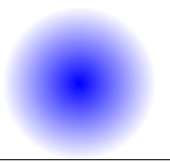
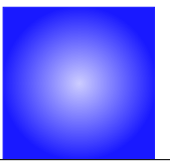
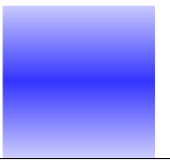
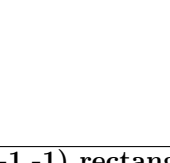
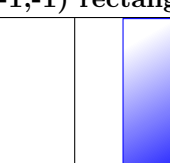
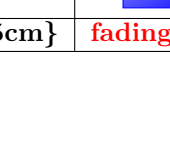
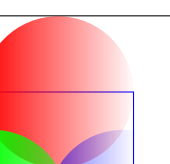
PGFmanual section : 23-4-1

<i>Création</i>	<i>Visualisation</i>
<pre> \begin{tikzfadingfrompicture}[name=filtre] \shade[left color=yellow,right color=blue!100] (0,0) rectangle (2,2); \fill[blue!50] (1,1) circle (0.7); \end{tikzfadingfrompicture} </pre>	
<pre> \begin{tikzfadingfrompicture}[name=tikz] \node [draw,text=transparent!20] {\fontfamily{ptm}\fontsize{25}{25}\bfseries\selectfont TikZ}; \end{tikzfadingfrompicture} </pre>	

Utilisation dans un rectangle	
\fill[ <b>path fading</b> =filtre] (-2,-1) rectangle (2,1);	
	
[ <b>path fading</b> =filtre]	[ <b>path fading</b> =tikz]
	
[path fading=filtre , <b>fit fading</b> =false]	[path fading=tikz, <b>fit fading</b> =false]
	
left color=blue,right color=red	[path left color=blue,right color=red]
	
[path fading=filtre ,red]	[path fading=tikz,red]

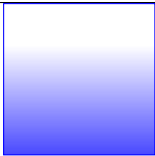
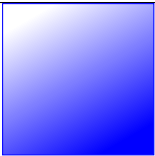
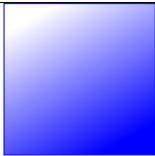
Utilisation dans un ellipse	
\fill[ <b>path fading</b> =filtre] (-2,-1) ellipse (2 and 1);	
	
[ <b>path fading</b> =filtre]	[ <b>path fading</b> =tikz]

### 14.3 Création de décoloration avec tikzfading

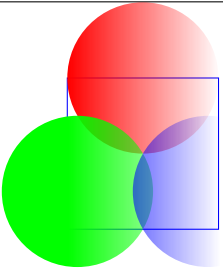
<pre>\tikzfading[name=fade right, left color=transparent!0, right color=transparent!100]</pre>	
<pre>\tikz \filldraw [red,path fading=fade right] (-1,-1) rectan- gle (1,1);</pre>	
<pre>\tikzfading[name=fade out, inner color=transparent!0, outer color=transparent!100]</pre>	
<pre>\tikz \filldraw [blue,path fading=fade out] (-1,-1) rectan- gle (1,1);</pre>	
<pre>\tikzfading[name=fade inside, inner color=transparent!80, outer color=transparent!10]</pre>	
<pre>\tikz \filldraw [blue,path fading=fade inside] (-1,-1) rect- angle (1,1);</pre>	
<pre>\tikzfading[name=middle, top color=transparent!80, bottom color=transparent!80, middle color=transparent!20]</pre>	
<pre>\tikz \filldraw [blue,path fading=middle] (-1,-1) rectangle (1,1);</pre>	

#### 14.3.1 Modification de la décoloration

PGFmanual section : 23-4-2

<pre>\fill [blue,path fading=north,fading transform={yshift=-.5cm}] (-1,-1) rectangle (1,1);</pre>			
<code>fading transform={yshift=-.5cm}</code>	<code>fading transform={yshift=-.5cm}</code>	<code>fading angle=30</code>	

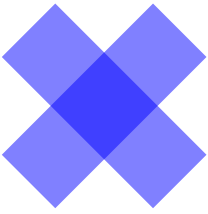
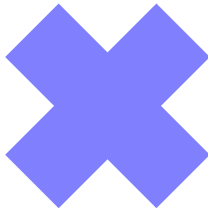
PGFmanual section : 23-4-3


<pre>\begin{tikzpicture} \draw (-1,-1) rectangle (1,1); \path [scope fading=east] (-1,-1) rectangle (1,1); \fill[red] ( 90:1) circle (1); \fill[green] (210:1) circle (1); \fill[blue] (330:1) circle (1); \end{tikzpicture}</pre>	
--	--

<pre> \tikz \node [black,scope fading=south,fading angle=45,text width=5cm] { VisualTIKZ VisualTIKZ VisualTIKZ Visu- alTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ Visu- alTIKZ VisualTIKZ VisualTIKZ }; </pre>	VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ
--	--

14.4 Transparency Groups

PGFmanual section : 23-5

<pre> \begin{tikzpicture}[opacity=.5] \draw [line width=1cm] (0,0) – (2,2); \draw [line width=1cm] (0,2) – (2,0); \end{tikzpicture} </pre>	
	
[opacity=.5]	[opacity=.5,transparency group]

A revoir : ne fonctionne pas	
<pre> \begin{tikzpicture} \shade [left color=red,right color=blue] (-2,-1) rect- angle (2,1); \begin{scope}[transparency group=knockout] \fill[white] (-1.9,-.9) rectangle (1.9,.9); \node [opacity=0] TikZ; \end{scope} \end{tikzpicture} </pre>	

## 15 Créer ses commandes

Charger l'extension: Attention : la création de la commande doit être placée avant `\begin{document}` !

syntaxe : `\newcommand{\nom}[nombre de variables]{Description}`

Exemple : commande avec une variable :

*Création*

```
\newcommand
{\maboite}[1]{ % commande nommée maboite et 1 seul d'argument
\begin{center} % centrage sur la ligne
\tikzpicture \node[fill=yellow] % un nœud de texte de couleur jaune
, text centered % centrage du texte dans la boîte
, text width=.5\linewidth] % largeur : la moitié de la ligne
#1} ; \end{center} % #1 correspond à l'argument
}
```

*Utilisation* : `\maboite{contenu}`

Charger l'extension: contenu

Exemple : commande sans variable :

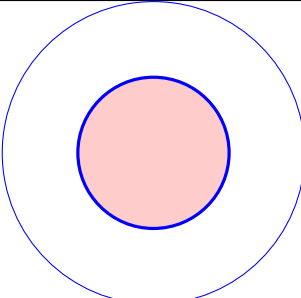
*Création*

```
\newcommand{\DFR}{\tikzpicture[scale=.25] \draw [fill=blue](0,0) rectangle (3,1.5);
\draw [fill=white](1,0) rectangle (2,1.5); \draw[fill=red](2,0) rectangle (3,1.5);\endtikzpicture }
```



*Utilisation* : `\DFR` 

## 16 Créer ses styles

### 16.1 Styles sans variable

	<pre>\begin{tikzpicture} [mon style/.style={draw=blue, fill=red!20, very thick}] \draw (0,0) circle (2cm); \draw[mon style] (0,0) circle (1cm); \end{tikzpicture}</pre>
---	---

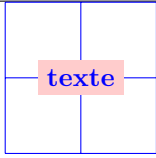
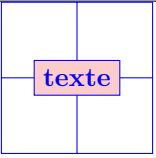
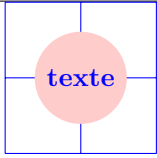
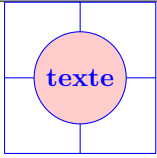
### 16.2 Styles avec variable

	<pre>\begin{tikzpicture} [mon style/.style={draw=#1, thick, fill=#1!50, scale=.5}] \filldraw [mon style=red] (0,0) rectangle (2,1); \filldraw [mon style=blue] (3,0) rectangle (5,1); \end{tikzpicture}</pre>
valeur par défaut	
	<pre>\begin{tikzpicture} [mon style/.style={draw=#1,fill=#1!20,very thick}, mon style/default=black] \filldraw [mon style] (0,0) rectangle (2,1); \filldraw [mon style=blue] (3,0) rectangle (5,1); \end{tikzpicture}</pre>















## 17 Mettre du texte en valeur

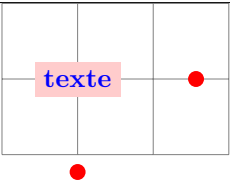
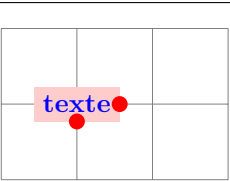
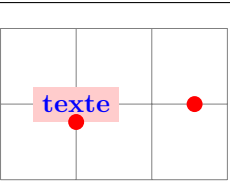
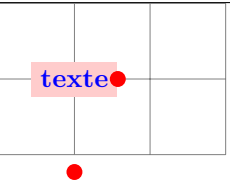
### 17.1 Dans un nœud de Tikz

\tikz \draw (0,0) grid (2,2) (1,1) node[fill=red!20,] {texte};			
			
node[fill=red!20]	node[fill=red!20,draw]	node[fill=red!20,circle]	node[fill=red!20,circle,draw]


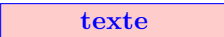

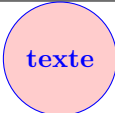
#### 17.1.1 Options

\tikz \draw node[draw,double,blue] {texte};							
							
double	rounded corners	ultra thick	dashed	red	rotate=45	shading=radial	text=red

\tikz \draw node[draw,inner sep=0pt] {texte};			
			
inner sep=0pt	inner sep=1cm	inner xsep=1cm	inner ysep=1cm
Par défaut : : 0.3333em			

\node [fill=red!20,outer sep=1cm] (A) at (1,1) {texte}; \fill (node cs:name=A,anchor=east) circle (3pt); \fill (node cs:name=A,anchor=south) circle (3pt);			
			
outer sep=1cm	outer sep=0pt	outer xsep=1cm	outer ysep=1cm
Par défaut : : 0.5\pgflinewidth			

#### 17.1.2 Taille minimale des noeuds

\draw((0,0) node[fill=blue!20,minimum height=1.5cm,draw] {texte} ;	
	
minimum height=1.5cm	minimum width=3cm
	
minimum size=1.5cm,draw	minimum size=1.5cm,circle

## 17.2 Dans un nœud à formes géométriques

Charger l'extension: `\usetikzlibrary{shapes.geometric}`

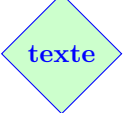
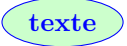


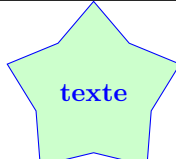
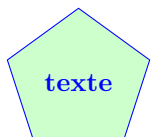
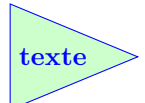
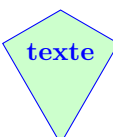
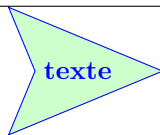
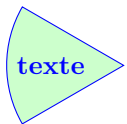

PGFmanual section : 67-3

### 17.2.1 Formes disponibles

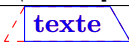
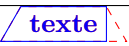
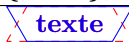
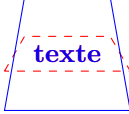

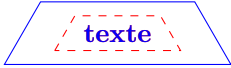
2 syntaxes :

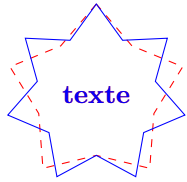
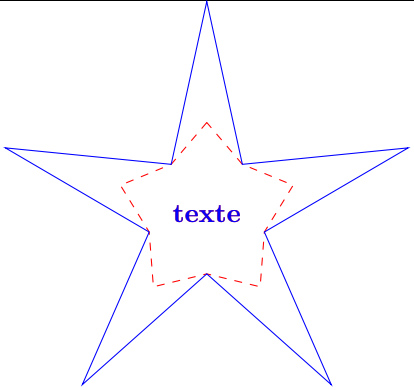
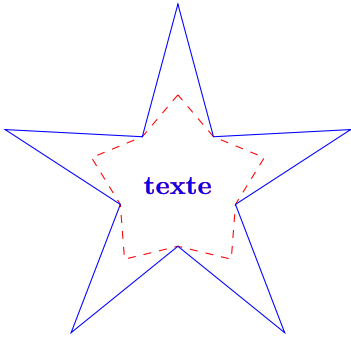
`\tikz \node[fill=green!20,shape=diamond,draw,blue] {texte};`

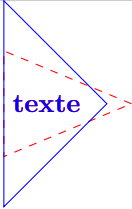
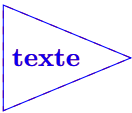
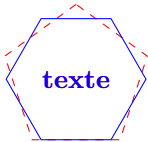
`\tikz \node[fill=green!20,diamond,draw] {texte};`

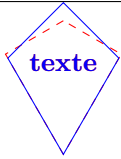
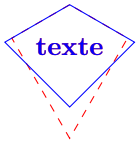
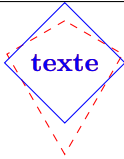
			
diamond	ellipse	trapezium	semicircle
			
star	regular polygon	isosceles triangle	kite
			
dart	circular sector	cylinder	

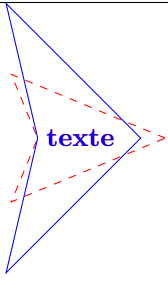
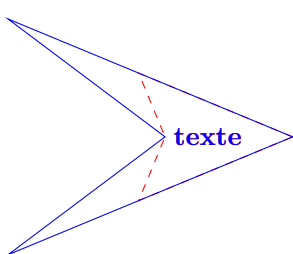
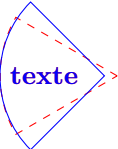
### 17.2.2 Options





<code>\node [trapezium,draw, trapezium left angle=90,draw,blue] {texte};</code>		
		
trapezium left angle=90	trapezium right angle=90	trapezium angle=120
		
minimum height=1.5cm trapezium stretches=true	minimum height=1.5cm trapezium stretches=false	minimum width=1.5cm trapezium stretches





<code>\tikz \node [fill=green!20,star,star points=6,draw] {texte};</code>		
		
<b>star points=7</b>	<b>star point height = 2cm</b>	<b>star point ratio = 3</b>
Par défaut : 5	Par défaut : .5cm	Par défaut : 1.5

<code>\node [isosceles triangle,isosceles triangle apex angle=90,draw,blue] {texte};</code> <code>\node [regular polygon, regular polygon sides=6,draw,blue] {texte};</code>		
		
<b>isosceles triangle apex angle=90</b>	<b>isosceles triangle stretches</b>	<b>regular polygon sides=6</b>

<code>\node [kite,kite upper vertex angle=90,draw,blue] {texte};</code>		
		
<b>kite upper vertex angle=90</b>	<b>kite lower vertex angle=90</b>	<b>kite vertex angles=90</b>
initially 120	initially 60	

<code>\node [dart,dart tip angle=90,draw,blue] {texte};</code>		
		
<b>dart tip angle=90</b>	<b>dart tail angle=90</b>	<b>circular sector angle=90</b>
initially 45	initially 135	initially 60

\node [cylinder,aspect=2,draw,blue] {texte};	
	
aspect=2	aspect=4
	
cylinder uses custom fill, cylinder end fill=yellow	cylinder uses custom fill, cylinder body fill=yellow

\draw(0,0) node[shape aspect=1,diamond,draw] {texte} ;			
			
shape aspect=1	shape aspect=2	shape aspect=3	shape aspect=4

## 17.3 Dans un nœud en forme de symboles

Charger l'extension: `\usetikzlibrary{shapes.symbols}`

PGFmanual section : 67-4

### 17.3.1 Formes disponibles




forbidden sign	magnifying glass	cloud
starburst	signal	tape





### 17.3.2 Options





<code>\node[magnifying glass,magnifying glass handle angle=45,draw,blue] {texte} ;</code>		
<b>magnifying glass handle angle=45</b>	<b>magnifying glass handle aspect=3</b>	<b>line width=1ex</b>
Par défaut : : -45	Par défaut : : 1.5	


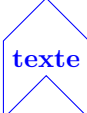
<code>\node [cloud,cloud puffs=5,draw,blue] {texte};</code>			
<b>cloud puffs=5</b>	<b>cloud puff arc=270</b>	<b>cloud ignores aspect=false</b>	<b>cloud ignores aspect=true</b>
Par défaut : : 10	Par défaut : : 135	Par défaut : : true	







<code>\node [starburst,starburst points=5,draw,blue] {texte};</code>			
<b>starburst points=5</b>	<b>starburst point height=1cm</b>	<b>random starburst=50</b>	<b>random starburst=0</b>

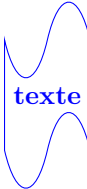
\node [signal,signal pointer angle=45,draw,blue] {texte};		
		
signal pointer angle=45	signal pointer angle=10	signal pointer angle=300
Par défaut : : signal pointer angle= 90		

\node [signal,signal to=above,draw,blue] {texte};			
			
signal to=above	signal to=below	signal to=right	signal to=above

\tikz [signal to=nowhere] \node [signal,signal from=above=45,draw,blue] {texte};			
			
signal from=above	signal from=below	signal from=right	signal from=above

	
signal from=east , signal to=west	signal from=south, signal to=north

\tikz \node [tape, draw,tape bend top=out and in] {texte};		
		
tape bend top=out and in	tape bend bottom=out and in	tape bend bottom=in and in
		
tape bend top=none	tape bend bottom=out and in tape bend top=out and in	tape bend bottom=in and out tape bend top=in and out (Par défaut : )



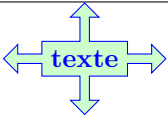
\tikz \node [tape, draw, tape bend height=1cm,blue] {texte};

Par défaut : : tape bend height = 5pt

## 17.4 Dans un nœud en forme de flèche

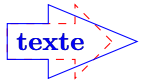
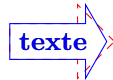
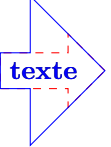

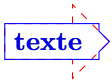
Charger l'extension: `\usetikzlibrary{shapes.arrows}`

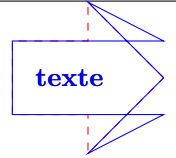
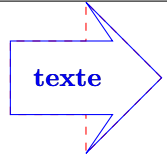
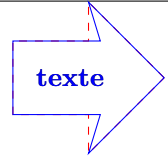
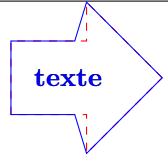
PGFmanual section : 67-5

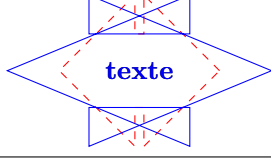
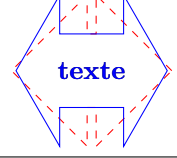
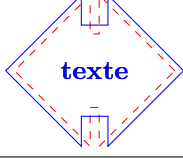
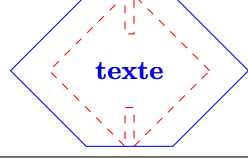
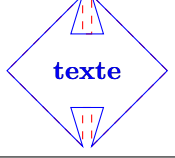
### 17.4.1 Formes disponibles

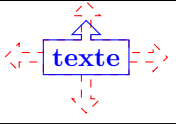
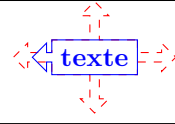
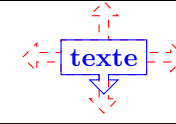
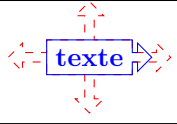
		
single arrow	double arrow	arrow box

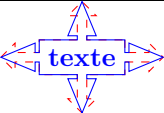
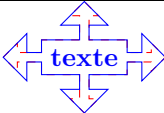
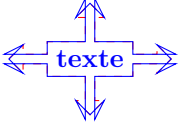
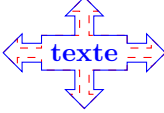
### 17.4.2 Options

<code>\node[single arrow,draw,red,single arrow tip angle=45] {texte};</code> <code>\node[single arrow,draw,red,single arrow head extend=.75cm] {texte};</code>				
				
angle=45	angle=120	extend=.75cm]	extend=0cm	extend=-1mm
Par défaut : : single arrow tip angle= 90			Par défaut : : single arrow head extend=0.5cm	

<code>\node[minimum size=2cm,single arrow,draw,red,single arrow head indent=1cm,blue] {texte};</code>			
			
indent=1cm	indent=10pt	indent=1ex	indent=-1ex

<code>\node[minimum size=2cm,double arrow,draw,red,double arrow tip angle=45] {texte};</code> <code>\node[minimum size=2cm,double arrow,draw,red,double arrow head extend=1ex] {texte};</code> <code>\node[minimum size=2cm,double arrow,draw,red,double arrow head indent=1ex] {texte};</code>				
				
angle=45	angle=120	extend=1ex	extend=0	indent=1ex

<code>\node [arrow box, draw, red, arrow box arrows={north:.25cm}] {texte};</code>			
			
{north:.25cm}	{west:.25cm}	{south:.25cm}	{east:.25cm}
Par défaut : : 0.5 cm			

\node [arrow box, draw, <b>arrow box tip angle=45</b> ] {texte};	
	
<b>arrow box tip angle=45</b>	<b>arrow box head extend=.25cm</b>
Par défaut : : 90	Par défaut : : 0.125cm
	
<b>arrow box head indent=.25cm</b>	<b>arrow box shaft width=.25cm</b>
Par défaut : : 0cm	Par défaut : : 0.125cm






## 17.5 Dans un nœud en forme de bulle









Charger l'extension: `\usetikzlibrary{shapes.callouts}`




PGFmanual section : 67-7

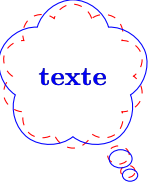

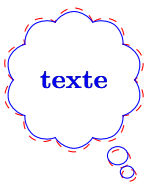
### 17.5.1 Formes disponibles






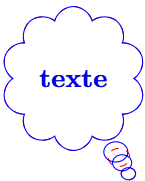
		
ellipse callout	rectangle callout	cloud callout

### 17.5.2 Options

\node [rectangle callout,draw,callout absolute pointer=(0,1)] at (2,1) {texte};							
							
callout relative pointer={ (0,1) }				callout absolute pointer={ (0,1) }			
							
callout pointer shorten=.5cm							

<code>\node [ellipse callout,draw,callout pointer arc=1] at (0,1.5) {texte};</code>		
		
<code>callout pointer arc=1</code>	<code>callout pointer arc=30</code>	<code>callout pointer arc=90</code>
Par défaut : <code>callout pointer arc=15</code>		

<code>\node[draw,cloud callout, aspect=2.5] {texte};</code>		
		
<code>cloud puffs=5</code>	<code>aspect=2.5</code>	<code>cloud puff arc=120</code>





\node [draw,cloud callout,callout pointer start size=.1] {texte};		
		
callout pointer start size=.1	start size=.8cm	start size=20pt and 1pt
Par défaut : : callout pointer start size =.2 of callout		
		
callout pointer end size=.5	callout pointer end size=.8cm	callout pointer segments=3
Par défaut : : callout pointer start size = .1 of callout	Par défaut : : segments=2	

## 17.6 Dans un nœud en diverses formes diverses

Charger l'extension: `\usetikzlibrary{shapes.misc}`






PGFmanual section : 67-8





### 17.6.1 Formes disponibles




			
cross out	strike out	rounded rectangle	chamfered rectangle

### 17.6.2 Options





Options pour “rounded rectangle” :




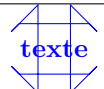

<code>\node [draw, rounded rectangle,rounded rectangle arc length=270] {texte};</code>				
				
270	180	120	90	45






<code>\node [draw, rounded rectangle,rounded rectangle west arc=concave] {texte};</code>				<code>\node [draw, rounded rectangle,rounded rectangle left arc=concave] {texte};</code>	
					
concave	convex	none			




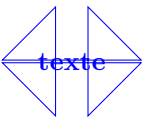
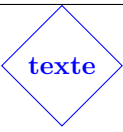
<code>\node [draw, rounded rectangle,rounded rectangle east arc=concave] {texte};</code>		<code>\node [draw, rounded rectangle,rounded rectangle right arc=concave] {texte};</code>	
			
concave	convex	none	



Options pour “chamfered rectangle” :

<code>\node [draw, chamfered rectangle,chamfered rectangle angle=30] {texte};</code>			
			
10	30	60	80
Par défaut : : 45			

<code>\node [draw, chamfered rectangle,chamfered rectangle xsep=10pt] {texte};</code>				
				
xsep=0pt	xsep=5pt	xsep=10pt	xsep=-10pt	xsep=2cm
Par défaut : : 0.666ex				

<code>\node [draw, chamfered rectangle,chamfered rectangle ysep=10pt] {texte};</code>				
				
ysep=0pt	ysep=5pt	ysep=10pt	ysep=-10pt	ysep=1cm

\node [draw, chamfered rectangle, <b>chamfered rectangle ysep=10pt</b> ] {texte};				
				
sep=0pt	sep=5pt	sep=10pt	sep=-10pt	sep=1cm

\node [draw, chamfered rectangle, <b>chamfered rectangle corners=north west</b> ] {texte};		
		
north west	{north east, south east}	{north east, south west}

## 17.7 Nœuds à plusieurs parties

Charger l'extension: `\usetikzlibrary{shapes.multipart}`

PGFmanual section : 67-6

<code>\node [circle split,draw,fill=green!20]{haut \nodepart{lower} bas };</code>			
circle split	circle solidus	ellipse split	rectangle split


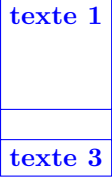


	<code>\node[rectangle split,rectangle split parts=5,draw]{texte 1\nodepart{second} texte 2\nodepart{four} texte 3};</code> Par défaut : : rectangle split parts=4
--	--

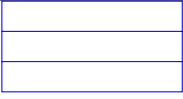

<code>\node [rectangle split,rectangle split parts=3,rectangle split horizontal,draw,blue]{texte1\nodepart{two}texte2\nodepart{three}texte3};</code>		

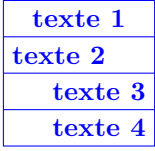
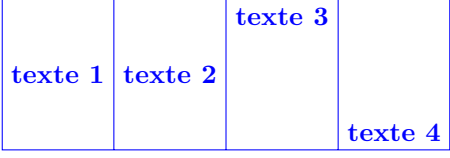
	<code>\node[rectangle split,rectangle split parts=5,draw]{texte 1\nodepart{second} texte 2a \\\texte 2b \\\texte 2c\nodepart{three} texte 3a \\\texte 3b };</code>
--	--

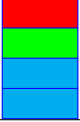
<code>\node[rectangle split, draw,blue,minimum size = 2cm,rectangle split draw splits= true]{texte 1 \nodepart{two} texte 2 \nodepart{three} texte 3 \nodepart{four} texte 4};</code>	
rectangle split draw splits= true Par défaut :	rectangle split draw splits= false

<code>\node [rectangle split,rectangle split parts=3,draw,rectangle split ignore empty parts=false]{texte 1 \nodepart{second} \nodepart{third}texte 3};</code>	
rectangle split ignore empty parts=false	rectangle split ignore empty parts=true

<code>\node [rectangle split,rectangle split parts=3,draw,rectangle split empty part depth=1cm] {texte 1 \nodepart{second} \nodepart{third}texte 3};</code>	
	
<b>rectangle split empty part depth=1cm</b>	<b>text depth=1cm</b>
Par défaut : : 0ex	Par défaut : : 0ex
	
<b>rectangle split empty part height=1cm</b>	<b>text height=1cm</b>
Par défaut : : 1ex	Par défaut : : 1ex

<code>\node [rectangle split,rectangle split parts=3,draw,rectangle split empty part width=1cm] {};</code>	
	
<b>rectangle split empty part width=2cm</b>	Par défaut : : 1ex

	<code>\node[rectangle split, draw,blue,minimum size = 2cm, rectangle split part align={center, left,right}] {texte 1 \nodepart{two} texte 2 \nodepart{three} texte 3 \nodepart{four} texte 4};</code>
	<code>\node[rectangle split, draw,blue,minimum size = 2cm, rectangle split horizontal, rectangle split part align={center,base, top,bottom}] {texte 1 \nodepart{two} texte 2 \nodepart{three} texte 3 \nodepart{four} texte 4};</code>

	<code>\node[rectangle split, draw,blue, minimum width=1cm, rectangle split part fill={red, green,cyan}]{};</code>
---	---

## 17.8 Mise en forme du texte

### 17.8.1 Position

PGFmanual section : 17-4-3

<pre>\tikz \draw (0,0) node[fill=blue!10,text width=2cm,text justified] {Ceci est une démonstration d'un texte sur une largeur de 2cm};</pre>			
sans option	text justified	text centered	text ragged
text badly ragged	text badly centered	align=center	align=flush center
align=justify	align=flush right	align=right	align=flush left



### 17.8.2 Couleur et fontes

<b>Texte.</b>	<i>Texte.</i>	<i>Texte.</i>	<i>Texte.</i>	<i>Texte.</i>	<i>Texte.</i>
[text= red]	[font=\itshape]	[font=\slshape]	[font=\scshape]	[font=\upshape]	[font=\bfseries]

### 17.8.3 Taille des fontes

<pre>\tikz \draw (0,0) node[font=\tiny]{Texte.}</pre>						
\tiny	\footnotesize	\small	\large	\Large	\huge	\Huge

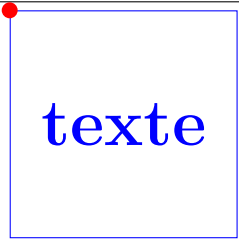
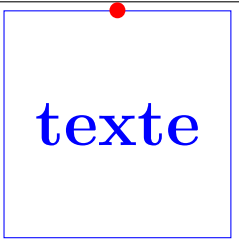
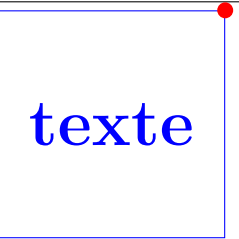
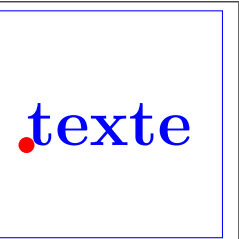
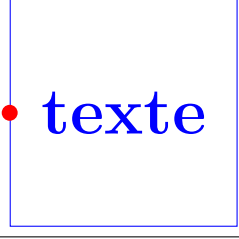
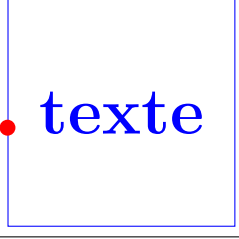
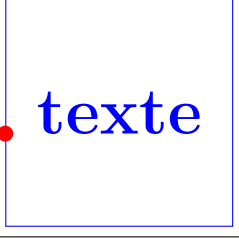
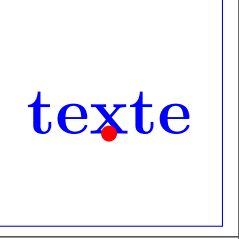
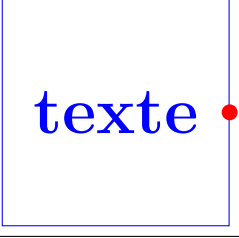
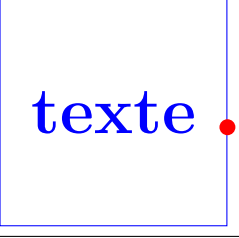
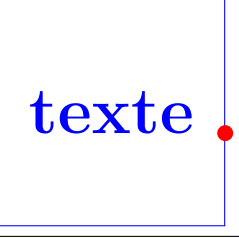
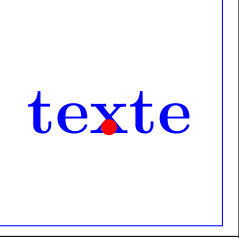
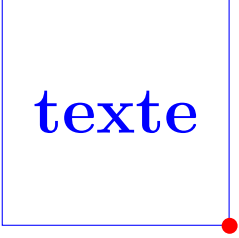
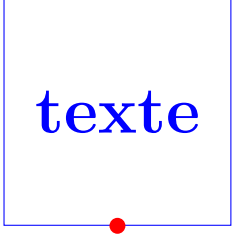
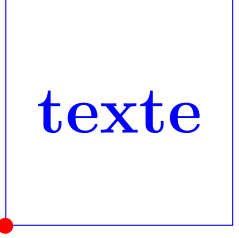
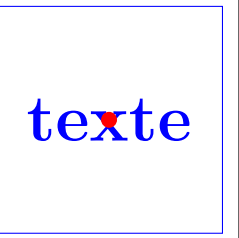
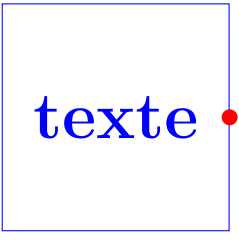
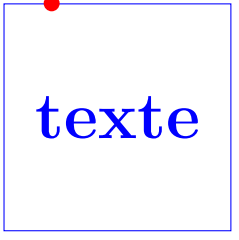
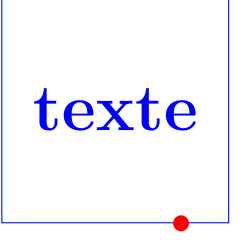
PGFmanual section : 17-4-4

	
<code>text height=1cm</code>	<code>text depth=1cm</code>

17.9 Positions prédéfinies sur un nœud

17.9.1 pour l'ensemble des nœuds

PGFmanual section : 17-5-1

			
north west	north	north east	text
			
west	mid west	base west	base
			
east	mid esat	base east	mid
			
south east	south	south west	center
			
0	120	-60	



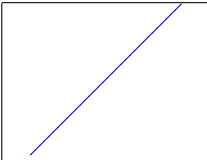
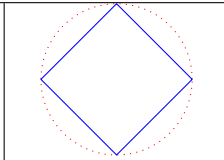
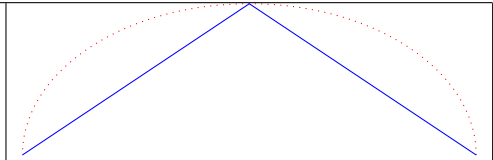
17.9.2 spécifique à un nœud  
 Dans une prochaine version !

## 18 Decorations

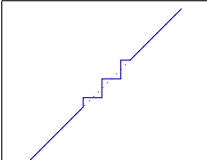
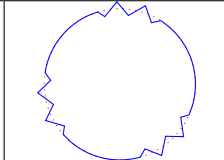
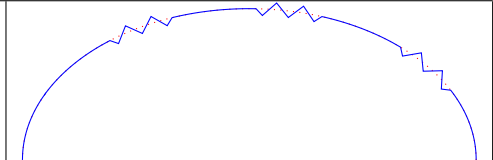
### 18.1 Library “decorations.pathmorphing”


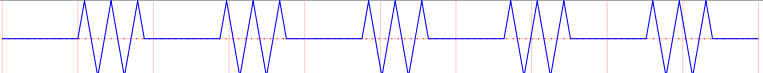
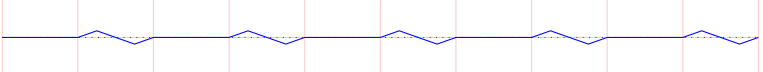
PGFmanual section : 48-2

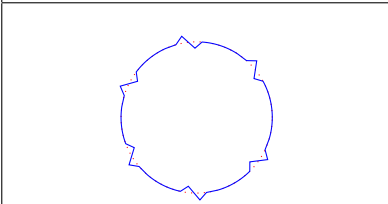
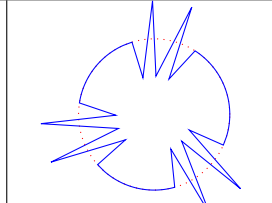
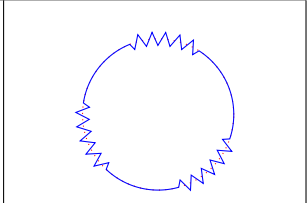
#### 18.1.1 “lineto”

		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

#### 18.1.2 “straight zigzag”

\draw[decorate,decoration=straight zigzag ] (0,0) - - (2,2) ;		
		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2);

\draw[decorate,decoration={straight zigzag,meta-segment length=2cm}] (0,0) - - (10,0);			Par défaut :
meta-segment length=2cm			1cm
amplitude=0.5cm			2.5pt
segment length=1cm			10pt

\draw[decorate,decoration={straight zigzag,meta-segment length=0.5cm}] (1,1) circle (1);		
		
meta-segment length=2cm	amplitude=0.5cm	segment length=5pt

### 18.1.3 “random steps”

\draw[decorate,decoration= <b>random steps</b> ] (0,0) - - (2,2) ;		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

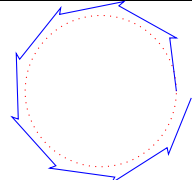
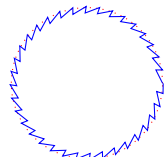
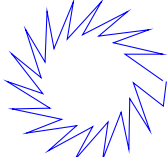
\draw[decorate,decoration={random steps, <b>segment length</b> =2cm}] (0,0) - - (10,0);			Par défaut :
<b>segment length</b> =2pt			10pt
<b>segment length</b> =1cm			
<b>amplitude</b> =0.5cm			2.5pt
<b>amplitude</b> =0.5cm <b>,segment length</b> =1cm			

\draw[decorate,decoration={random steps, <b>segment length</b> =2cm}] (1,1) circle (1);		
<b>meta-segment length</b> =2cm	<b>amplitude</b> =0.5cm	<b>segment length</b> =5pt

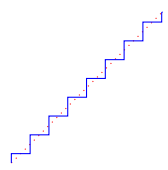
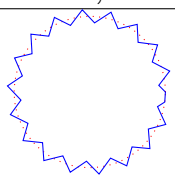
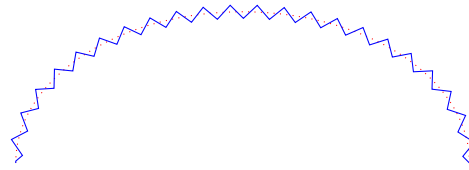
### 18.1.4 “saw”



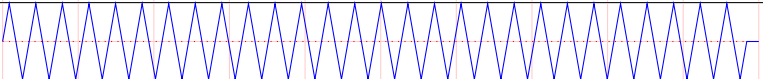
\draw[decorate,decoration= <b>saw</b> ] (0,0) - - (2,2) ;		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2);

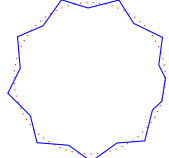
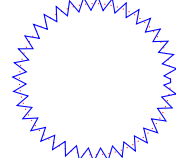
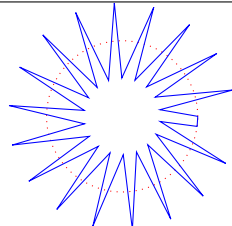
\draw[decorate,decoration={saw, <b>meta-segment length</b> =0.5cm}] (0,0) - - (10,0);			Par défaut :
<b>segment length</b> =0.5cm			10 pt
<b>segment length</b> =2cm			
<b>amplitude</b> =0.5cm			2.5 pt

<code>\draw[decorate,decoration={saw,segment length=20pt}] (1,1) circle (1);</code>		
		
<b>segment length=20pt</b>	<b>segment length=5pt</b>	<b>amplitude=0.5cm</b>

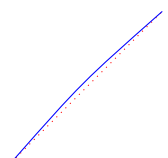
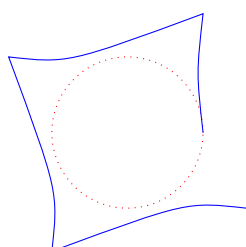
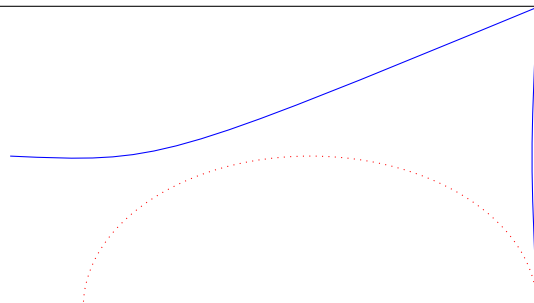
### 18.1.5 “zigzag”


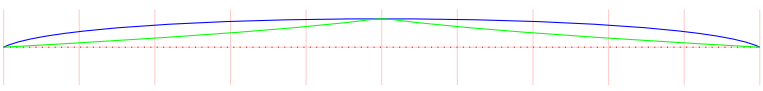
<code>\draw[decorate,decoration=zigzag ] (0,0) - - (2,2) ;</code>		
		
<code>(0,0) - - (2,2)</code>	<code>(1,1) circle (1)</code>	<code>(0,0) arc (0:180:3 and 2);</code>

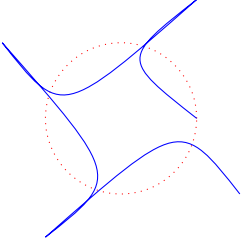
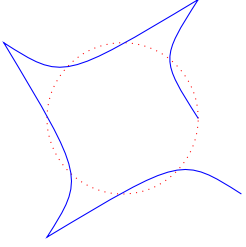
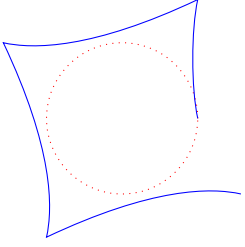
<code>\draw[decorate,decoration={zigzag,meta-segment length=2cm}] (0,0) - - (10,0);</code>		Par défaut :
<b>segment length=0.5cm</b>		10pt
<b>segment length=2cm</b>		
<b>amplitude=0.5cm</b>		2.5 pt

<code>\draw[decorate,decoration= {saw,segment length=20pt } ] (1,1) circle (1);</code>		
		
<b>segment length=20pt</b>	<b>segment length=5pt</b>	<b>amplitude=0.5cm</b>

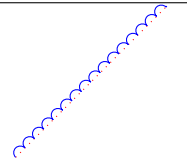
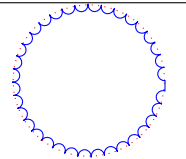
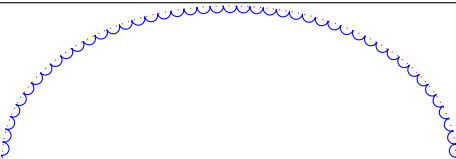
### 18.1.6 “bent”

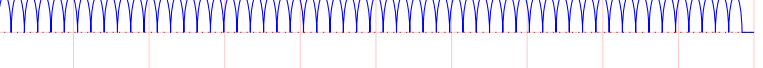
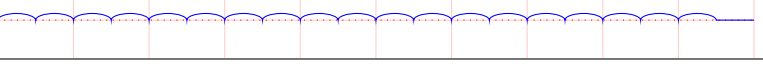
		
<code>(0,0) - - (2,2)</code>	<code>(1,1) circle (1)</code>	<code>(0,0) arc (0:180:3 and 2);</code>

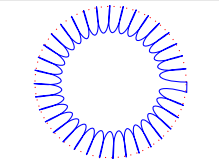
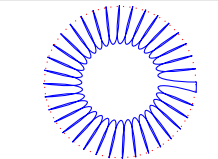
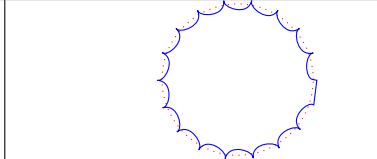
<code>\draw[decorate,decoration={bent,amplitude=0.5cm}] (0,0) - (10,0);</code>		Par défaut :
<code>amplitude=0.5cm</code>		2.5 pt
<code>aspect=0.1 (en bleue)</code> <code>aspect=0.9 (en vert)</code> <code>amplitude=0.5cm</code>		0.5

		
<code>amplitude=1cm</code>	<code>amplitude=0.5cm</code>	<code>aspect=0.25</code>

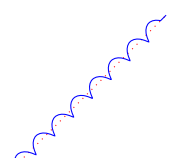
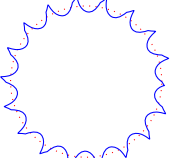
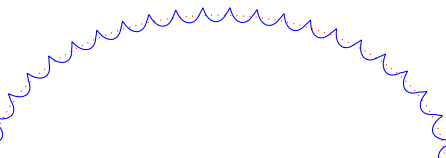
### 18.1.7 “bumps”

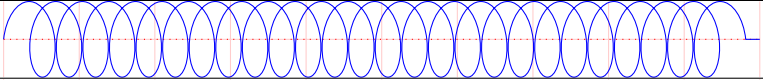
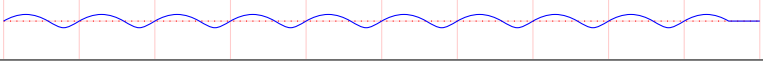
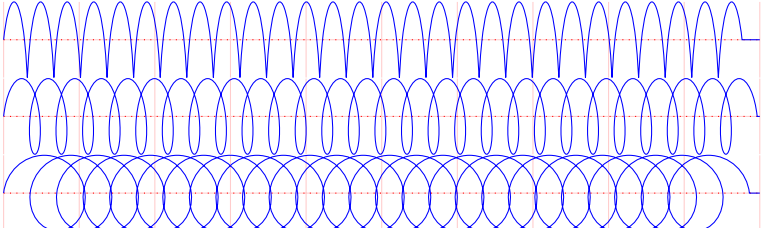
<code>\draw[decorate,decoration={bumps}] (0,0) - - (2,2);</code>		
		
<code>(0,0) - - (2,2)</code>	<code>(1,1) circle (1)</code>	<code>(0,0) arc (0:180:3 and 2)</code>

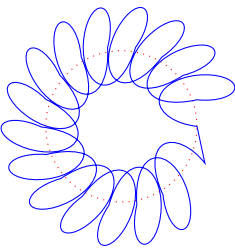
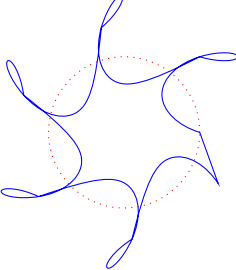
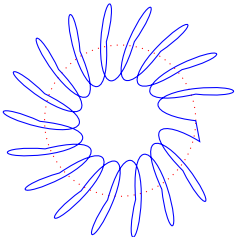
<code>\draw[decorate,decoration={bumps,amplitude=0.5cm}] (0,0) - - (10,0);</code>		Par défaut :
<code>amplitude=0.5cm</code>		2.5 pt
<code>segment length=1cm</code>		10 pt

<code>\draw[decorate,decoration={bumps,amplitude=10pt}] (1,1) circle (1);</code>		
		
<code>amplitude=10pt</code>	<code>amplitude=0.5cm</code>	<code>segment length=20pt</code>

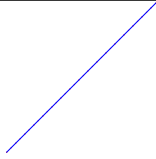
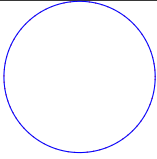
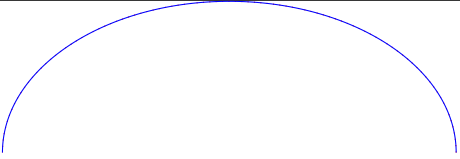
### 18.1.8 “coil”

<code>\draw[decorate,decoration={coil}] (0,0) - - (2,2);</code>		
		
<code>(0,0) - - (2,2)</code>	<code>(1,1) circle (1)</code>	<code>(0,0) arc (0:180:3 and 2)</code>

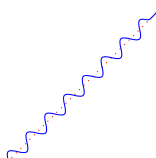
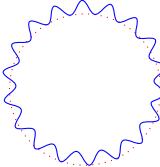
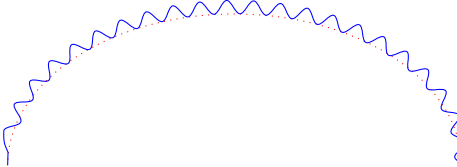
\draw[decorate,decoration={coil,amplitude=0.5cm}] (0,0) - - (10,0);		Par défaut :
amplitude=0.5cm		2.5 pt
segment length=1cm		10 pt
aspect=0.1 (amplitude=0.5cm)		0.5
aspect=0.3		
aspect=0.9		

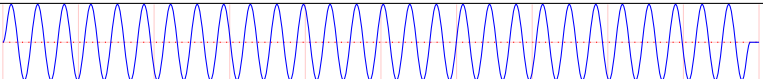
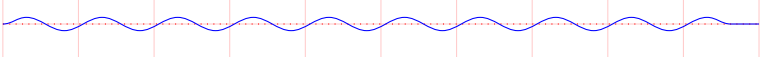
\draw[decorate,decoration={coil,amplitude=0.5cm}] (1,1) circle (1);		
		
amplitude=0.5 cm	segment length=1cm amplitude=0.5cm	aspect=0.25 amplitude=0.5cm

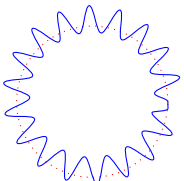
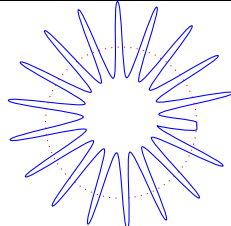
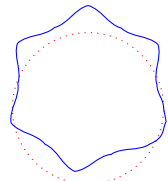
#### 18.1.9 “curveto”

		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

#### 18.1.10 “snake”

\draw[decorate,decoration={snake,segment length=2cm}] (0,0) - - (2,2) ;		
		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

\draw[decorate,decoration={snake,segment length=2cm}] (0,0) - - (10,0);		Par défaut :
amplitude=0.5cm		2.5 pt
segment length=1cm		10 pt

\draw[decorate,decoration= snake, amplitude=5pt] (1,1) circle (1);		
		
amplitude=5pt	amplitude=0.5cm	segment length=5pt

## 18.2 Library “decorations.pathreplacing”

Charger l’extension: `\usetikzlibrary{decorations.pathreplacing}`

PGFmanual section : 48-3

### 18.2.1 “border”

<code>\draw[decorate,decoration=<b>border</b>] (0,0) - - (2,2) ;</code>		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

<code>\draw[decorate,decoration={border,<b>amplitude</b>=0.5cm}] (0,0) - - (10,0);</code>		Par défaut :
<b>amplitude</b> =0.5cm		2.5 pt
<b>segment length</b> =1cm , <b>amplitude</b> =0.5cm		10 pt
<b>angle</b> =90 , <b>amplitude</b> =0.5cm		45

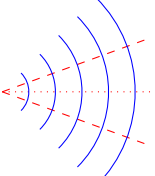
<code>\draw[decorate,decoration={border,<b>amplitude</b>=0.5cm}] (1,1) circle (1);</code>		
<b>amplitude</b> =0.5cm	<b>segment length</b> =1cm , <b>amplitude</b> =0.5cm	<b>angle</b> =90 , <b>amplitude</b> =0.5cm

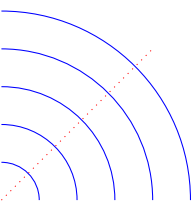
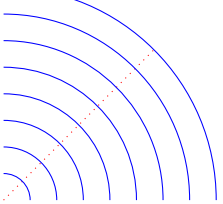
### 18.2.2 “brace”

	<code>\draw [decorate,<b>decoration</b>=<b>brace</b>] (0,0) - - (3,1);</code>
--	---

<code>\draw[decorate,decoration={brace,<b>amplitude</b>=0.5cm}] (1,1) circle (1); ;</code>			
<b>amplitude</b> =0.5cm	<b>aspect</b> =0.65 , <b>amplitude</b> = 0.5cm	<b>raise</b> = 0.25cm , <b>amplitude</b> = 0.5cm	<b>mirror</b> , <b>amplitude</b> = 0.5cm
Par défaut : : 2.5	Par défaut : : 0.5	Par défaut : : 0	

### 18.2.3 "expanding waves"

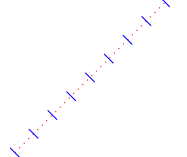
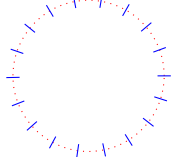
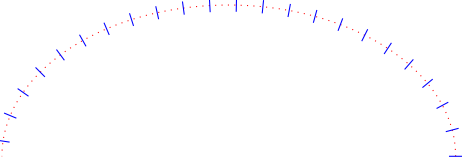
	<pre>\draw [dashed,red](0,0) -- (20:2) ; \draw [dashed,red](0,0) -- (-20:2) ; \draw [decorate,decoration={expanding waves}](0,0) -- (2,0) ;</pre>
---	---

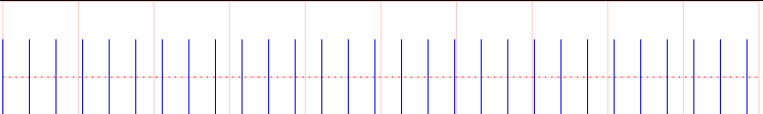

\draw[decorate,decoration= {expanding waves,segment length=0.5cm}] (1,1) circle (1);	
	
<b>segment length=0.5cm</b>	<b>angle=45</b>
Par défaut : : 10pt	Par défaut : : 20

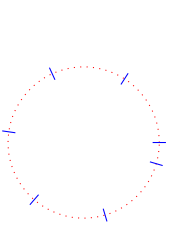
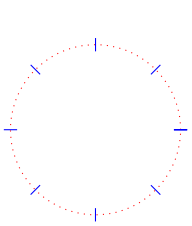
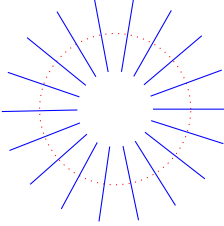
### 18.2.4 "moveto"

voir page 113

### 18.2.5 "ticks"

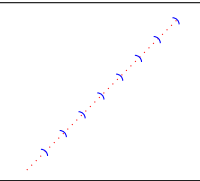
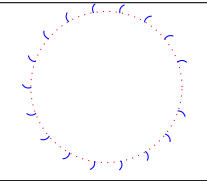
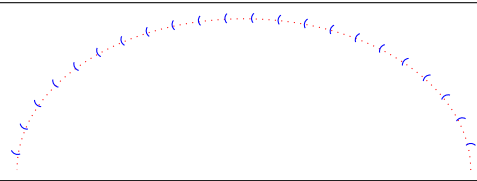
\draw[decorate,decoration=ticks] (0,0) -- (2,2) ;		
		
(0,0) -- (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

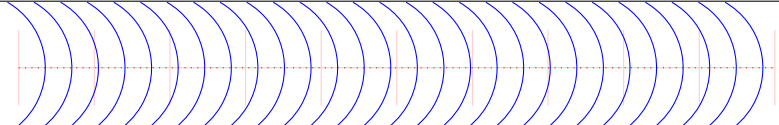
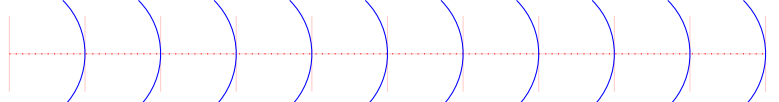
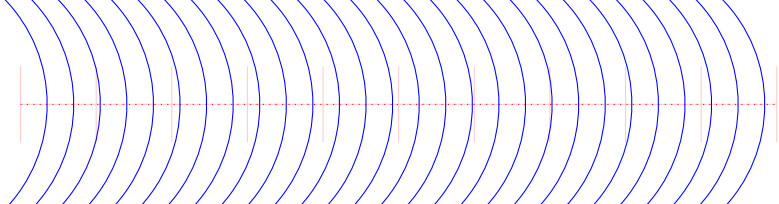
\draw[decorate,decoration={ticks,amplitude=0.5cm}] (0,0) -- (10,0);		Par défaut :
<b>amplitude=0.5cm</b>		2.5 pt
<b>segment length=1cm</b>		10 pt

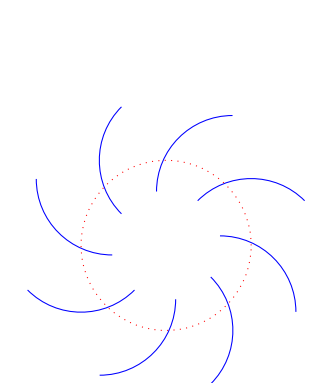
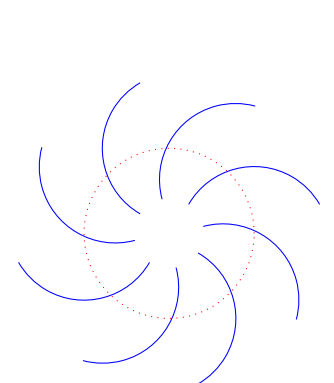
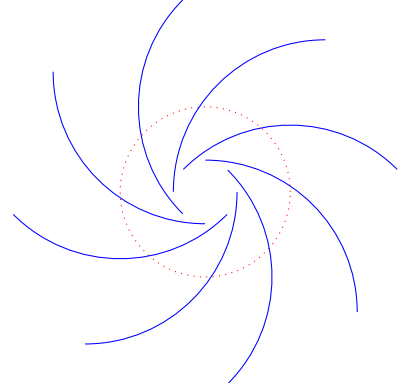
\draw[decorate,decoration= {ticks,segment length=1cm}] (1,1) circle (1);		
		
<b>segment length=1cm</b> (1,1) circle (1)	<b>segment length=pi*8</b> (1,1) circle (32pt)	<b>amplitude=0.5cm</b> (1,1) circle (1)



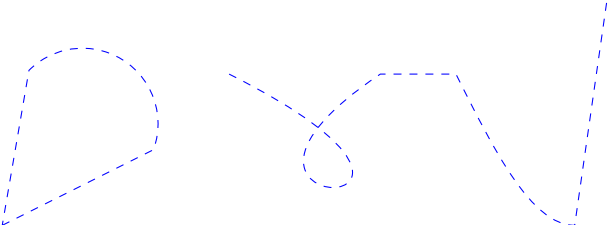
### 18.2.6 "waves"

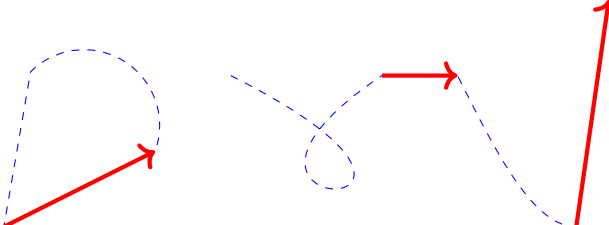
\draw[decorate,decoration= <b>waves</b> ] (0,0) - - (2,2) ;		
		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

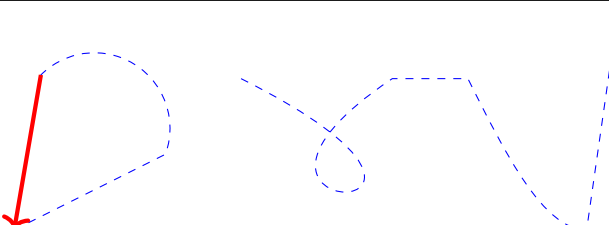
\draw[decorate,decoration={waves, <b>angle</b> =60, <b>radius</b> =1cm}] (0,0) - - (10,0);		Par défaut :
<b>angle</b> =60		45
<b>segment length</b> =1cm		10 pt
<b>radius</b> =2cm		10 pt

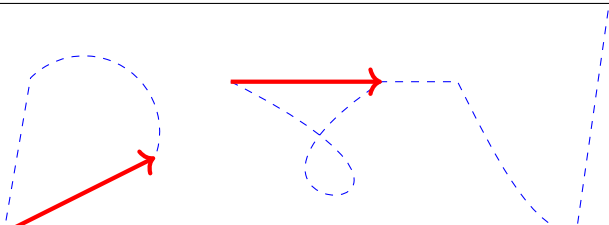
\draw[decorate,decoration={waves, <b>segment length</b> =pi*8, <b>radius</b> =1cm}] (1,1) circle (32pt);		
		
<b>segment length</b> = pi*8	<b>angle</b> =60 , segment length = pi*8	<b>radius</b> =2cm , segment length = pi*8

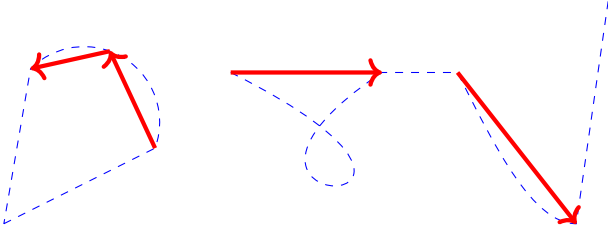
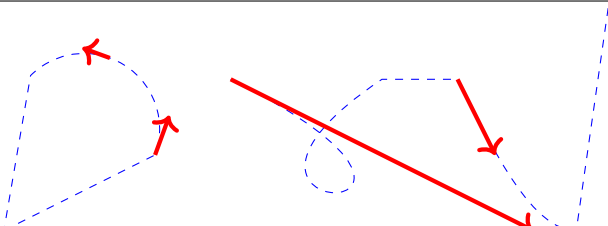
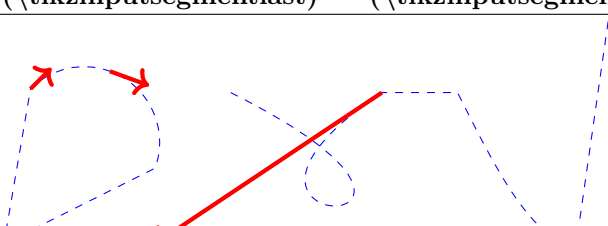
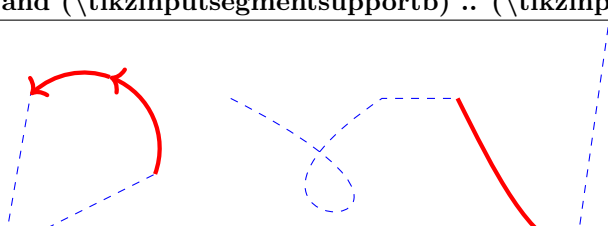
### 18.2.7 “show path construction”

<i>Chemin à décorer</i>
<pre>\draw [blue,dashed] (0,0) -- (2,1) arc (-20:135:1) -- cycle (3,2) .. controls (7,0) and (2,0) .. (5,2) -- (6,2) sin (7.57,0) -- (8,3) ;</pre>


composantes linéaires : “lineto”
<pre>decoration={ show path construction, lineto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) -- (\tikzinputsegmentlast); },}</pre>


Fermetures de chemin : “closepath”
<pre>decoration={ show path construction, closepath code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) -- (\tikzinputsegmentlast); },}</pre>


coupure de chemin : “moveto”
<pre>decoration={ show path construction, moveto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) -- (\tikzinputsegmentlast); },}</pre>


composants courbes : “curveto”	
<pre>decoration={ show path construction, curveto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) - - (\tikzinputsegmentlast); },}</pre>	
	
<pre>decoration={ show path construction, curveto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) - - (\tikzinputsegmentsupporta); },}</pre>	
	
<pre>decoration={ show path construction, curveto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentlast) - - (\tikzinputsegmentsupportb); },}</pre>	
	
<pre>decoration={ show path construction, curveto code={ \draw [red,ultra thick,-&gt;] (\tikzinputsegmentfirst) .. controls (\tikzinputsegmentsupporta) and (\tikzinputsegmentsupportb) .. (\tikzinputsegmentlast) ; },}</pre>	
	
<pre>.. controls (7,0) and (2,0) .. (5,2)</pre>	
ne fonctionne pas !	

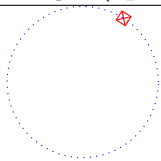
## 18.3 Library “decorations.markings”

Charger l'extension: `\usetikzlibrary{decorations.markings}`

PGFmanual section : 48-4

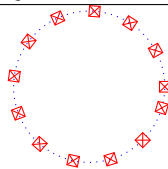
### 18.3.1 Sa marque à une position

```
\draw [decorate,decoration={markings,mark=at position 1cm
with { \draw[red] (-2pt,-2pt) - - (2pt,2pt); \draw[red](2pt,-2pt) - - (-2pt,2pt);
\draw[red] (-2pt,-2pt) rectangle (2pt,2pt); }}] (1,1) circle (1);
```

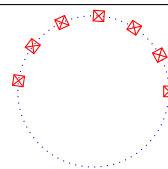


### 18.3.2 Ses marques : origine, fin et pas

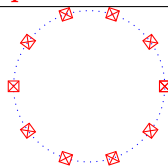
```
\draw[decorate,{markings,mark=between positions 0 and 1 step 5mm with ... }] (1,1) circle (1);;
```



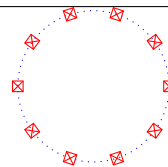
mark=between positions 0 and 1 step 5mm



between positions 0 and 0.5 step 5mm



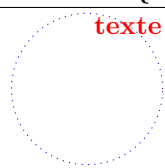
mark= between positions 0 and 1 step 1/10



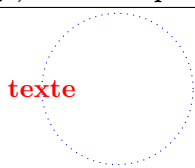
between positions 0 and 1 step 0.1

### 18.3.3 Marque avec un nœud contenant du texte

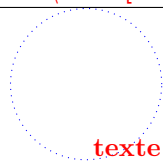
```
decoration={markings,mark=at position 1cm with \node[red]{texte}}
```



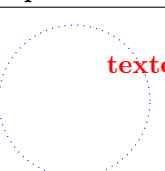
at position 1cm



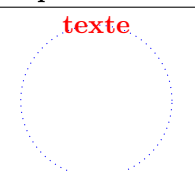
at position 0.5



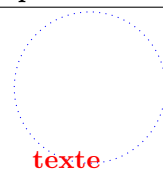
at position -1cm



at position 1cm/2

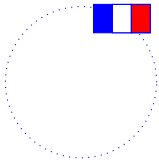
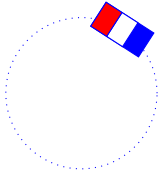
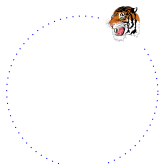
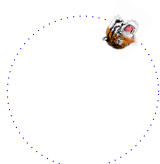


at position 0.5/2

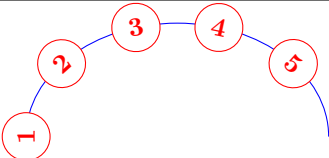
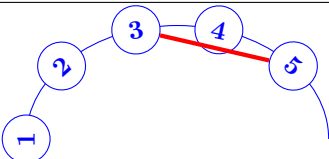


at position -0.5/2


### 18.3.4 Marque avec un nœud contenant une image

<code>\draw [decorate,decoration={markings,mark=at position 1cm with \node{\DFR}; } ] (1,1) circle (1);</code>	
	
<code>\node{\DFR}</code>	<code>\node[transform shape]{\DFR}</code>
	
<code>\node{\includegraphics[width=0.5cm]{tiger} }</code>	<code>\node[transform shape]{\includegraphics[width=0.5cm]{tiger} }</code>

### 18.3.5 Numérotation des marques et affectation d'un nom

	<code>decoration={markings, mark=between positions 0 and 1 step 0.2 with { \node [draw , circle ,fill=white, name= marque-\pgfkeysvalueof{/pgf/decoration/mark info/sequence number}, transform shape] {\pgfkeysvalueof{/pgf/decoration/mark info/sequence num- ber}};}}</code>
	<code>\draw [red,ultra thick] (marque-3) - - (marque-5);</code>

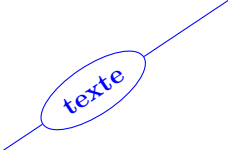
### 18.3.6 Distance des nœuds

	
<code>decoration={markings, mark=between positions 0 and 1 step 40pt with { \node [red,draw,ellipse,fill=white,font=\tiny] {\pgfkeysvalueof{/pgf/decoration/mark info/distance from start} };} }</code>	

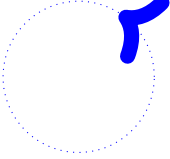
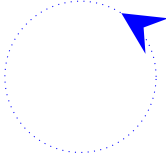
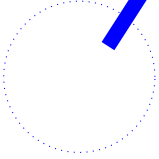
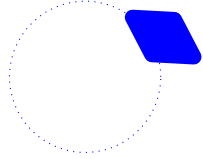
`/pgf/decoration/reset marks` (no value)

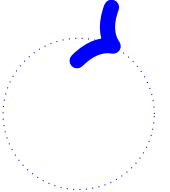
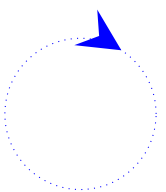
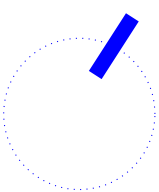
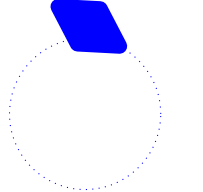
`/pgf/decoration/mark connection node=node name` (no default, initially empty)

### 18.3.7 Nœud sur une liaison

	<pre>\draw [decorate,decoration={markings, mark connection node=mon noeud,mark=at position 0.4 with {\node [draw,ellipse,blue,transform shape] (mon noeud) {texte};}}] (0,0) -- (3,2) ;</pre>
---	---

### 18.3.8 Arrow Tip Markings

<pre>\draw[decorate,decoration={ markings,mark=at position 1cm with {\arrow[blue,line width=2mm]{&gt;}}}] (1,1) circle (1);</pre>			
			
<pre>{&gt;}</pre>	<pre>{stealth }</pre>	<pre>{ }</pre>	<pre>{diamond}</pre>
Autres possibilités et paramètres voir page 20 et suivantes			

<pre>\draw[decorate,decoration={markings,mark=at position 1cm with {\arrowreversed[blue,line width=2mm]{&gt;}}}] (1,1) circle (1);</pre>			
			
<pre>{&gt;}</pre>	<pre>{stealth }</pre>	<pre>{ }</pre>	<pre>{diamond}</pre>

## 18.4 Library “decorations.footprints”

Charger l'extension: `\usetikzlibrary{decorations.footprints}`

PGFmanual section : 48-5-2

<code>\tikz \draw[decorate,decoration=footprints] (0,0) -- (10,0);</code>

<code>\draw[decorate,decoration={footprints,foot of = gnome}] (0,2.5) -- (3,2.5);</code>				
foot of = <b>gnome</b>	foot of = <b>human</b> (Par défaut : )	foot of = <b>bird</b>	foot of = <b>felis silvestris</b>	

<code>\fill[decorate,decoration={footprints,foot of = gnome}] (0,2.5) -- (3,2.5);</code>				
foot of = <b>gnome</b>	foot of = <b>human</b>	foot of = <b>bird</b>	foot of = <b>felis silvestris</b>	

<code>\fill[decorate,decoration={footprints,foot length=20pt}] (0,2.5) -- (3,2.5);</code>		
<b>foot length=1cm</b> Par défaut : : 10pt	<b>stride length=2cm</b> Par défaut : : 30pt	
<b>foot sep=1cm</b> Par défaut : : 4pt	<b>foot angle = 45</b> Par défaut : : 10	

<code>\fill[decorate,decoration={footprints,foot length=20pt}] (0,2.5) -- (3,2.5);</code>				
<b>foot length=20pt</b> Par défaut : : foot length=10pt	<b>foot length=1cm</b> Par défaut : : foot length=10pt	<b>stride length=15pt</b> Par défaut : : stride length=30pt	<b>stride length=2cm</b> Par défaut : : stride length=30pt	
<b>foot sep=10pt</b> Par défaut : : foot sep=4pt	<b>foot sep=1cm</b> Par défaut : : foot sep=4pt	<b>foot angle = -45</b> Par défaut : : foot angle=10	<b>foot angle = 45</b> Par défaut : : foot angle=10	

18.5 Library “decorations.shapes”

18.5.1 Introduction

Charger l’extension: `\usetikzlibrary{decorations.shapes}`

PGFmanual section : 48-5-3

<code>\draw[decorate,decoration=crosses] (0,0) - - (3,0);</code>		
<b>crosses</b>	<b>triangles</b>	<b>shape backgrounds</b>









<code>\draw[decorate,decoration={crosses,segment length=1cm}](0,0) - - (10,0);</code>	
<b>segment length = 1cm</b>	
<b>shape width = 1cm</b>	
<b>shape height = 1cm</b>	
<b>shape size = 1cm</b>	
Par défaut : : shape width = shape height = 2.5pt	



18.5.2 “shape backgrounds”


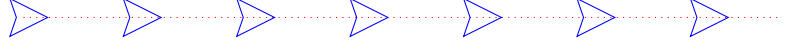
<code>\draw[decorate with=dart] (0,2.5) - - (3,2.5);</code>			
<b>dart</b>	<b>diamond</b>	<b>rectangle</b>	<b>circle</b>
<b>star</b>	<b>regular polygon</b>	<b>signal</b>	<b>kite</b>
Autres possibilités et paramètres voir page 74 et suivantes			


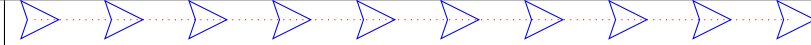
Formes disponibles	
<i>Syntaxe</i>	<code>\draw[decorate,decoration={ <b>shape backgrounds</b>,shape=dart, shape size=.5cm,shape sep=1cm}] (0,0) - - (10,0);</code>
<i>Autre syntaxe</i>	<code>\draw[<b>decorate with</b>=dart,decoration={shape size=.5cm,shape sep=1cm}] (0,0) - - (10,0);</code>
<b>dart</b>	
<b>rectangle</b>	
<b>cloud</b>	
<b>star</b>	
<b>starburst</b>	
<b>tape</b>	
<b>kite</b>	
<b>signal</b>	
Par défaut : : shape= circle	
Autres possibilités voir page 74 et suivantes	

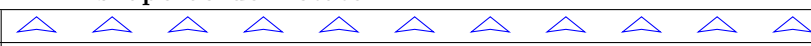
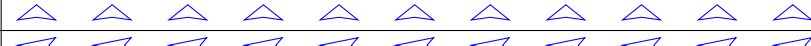



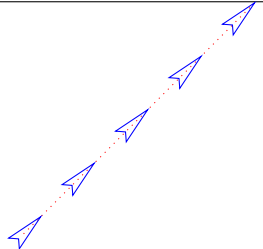
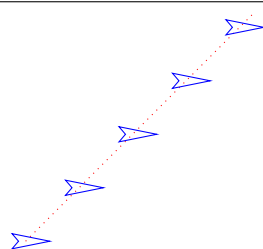
Paramètres			
\draw[decorate with=star,star points=3,decoration={shape size=.5cm,shape sep=1cm}](0,2.5) - - (3,2.5);			
			
star points=3	star points=4	star points=5	star points=8
\draw[decorate with=star,paint=green,decoration={shape size=.5cm,shape sep=1cm}](0,2.5) - - (3,2.5);			
			
paint=green	double	ultra thick	star point ratio = 3

Espacement	
\draw[decorate with=dart,decoration={shape size=.5cm,shape sep=1cm}](0,2.5) - - (10,2.5);	
shape sep={1cm}	
shape sep={2cm}	
Par défaut : : shape sep= 0.25cm	

Type d'espacement	
\draw[decorate with=dart,decoration={shape size=.5cm,shape sep={1cm,between centers}}](0,2.5) - - (10,2.5);	
between centers	
between borders	
Par défaut : : between centers	

Espacement automatique	
\draw[decorate with=dart,decoration={shape size=.5cm,shape evenly spread=5}](0,0) - - (10,0);	
shape evenly spread=5	
shape evenly spread=10	

Orientation : " shape border rotate "	
shape border rotate=90	
shape border rotate=45	
shape border rotate=180	

"shape sloped"	
\draw[decorate with=dart,decoration={shape width=.5cm,shape sep=1cm,shape sloped=true}](0,0) - - (3,3);	
	
shape sloped=true	shape sloped=false
Par défaut : : shape sloped=true	

$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape width}=.5\text{cm},\text{shape sep}=1\text{cm},$ $\text{shape sloped}=\text{true}\}] (0,0) \text{ arc } (0:180:3 \text{ and } 2);$	
shape sloped=true	shape sloped=false
Par défaut : : shape sloped=true	

$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape width}=.5\text{cm},\text{shape sep}=1\text{cm},$ $\text{shape border rotate}=90,\text{shape sloped}=\text{true} \}] (0,0) - - (3,3);$	
shape sloped=true	shape sloped=false

“shift only”	
decoration= <b>transform={shift only}</b> ,shape width=5mm,segment length=.5cm,shape sep=1cm	
avec	sans

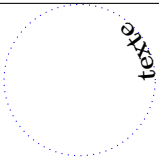
Dimensions	
$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape size}=.5\text{cm},$ $\text{shape height}=1\text{cm} \}] (0,0) - - (10,0);$	
shape height=1cm	
shape width=1cm	
shape size=1cm	

$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape size}=.5\text{cm},$ $\text{shape start size}=1\text{cm},\text{shape scaled }\}\] (0,2.5) - - (10,2.5);$	
<b>shape start size=1cm</b>	
<b>shape start height=1cm</b>	
<b>shape start width=1cm</b>	
<b>shape end size=1cm</b>	
<b>shape end height=1cm</b>	
<b>shape end width=1cm</b>	


## 18.6 Library “decorations.text”

Charger l’extension: `\usetikzlibrary{decorations.text}`

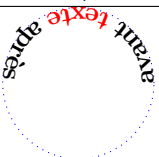
PGFmanual section : 48-6

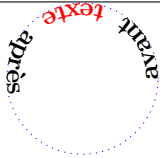
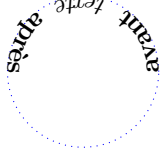

<code>\draw[decorate,decoration={text along path,text={texte}}] (1,1) circle (1);</code>


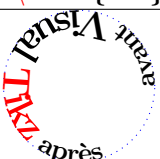
Texte trop long

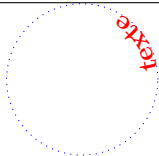
<code>\draw[decorate,decoration={text along path, text={Un Deux Trois Quatre Cinq Six sept Huit Neuf Dix}}] (1,1) circle (1);</code>


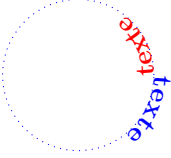
Format du texte

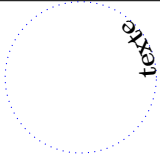
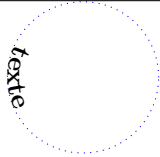
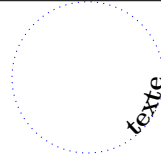
<code>\draw [decorate,decoration={text along path, text=avant  \red   texte     après }]</code>

<code>text={avant  \red texte   après }    text={  \red texte   }    text={  \red texte   { } }</code>

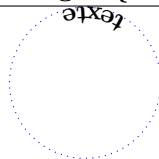
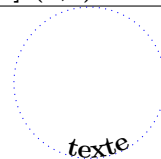
		
avant   <code>\red</code>   texte     après	avant   <code>\it</code>   texte     après	avant   <code>\Huge</code>   texte     après

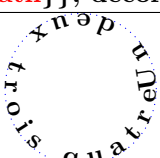
<code>\draw [decorate,decoration={text along path, text={avant  \Large Visual  + \bf\color{red} Tikz  après }}] (1,1) circle (1);</code>


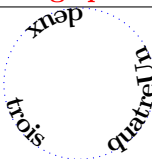
<code>\draw [decorate,decoration={text along path,text format delimiters={ } }, text={ [ \red ] texte [ ] } } ] (1,1) circle (1);</code>


Sens du texte
<code>\draw[decorate,decoration={text along path,text={texte},text color=blue, reverse path }] (1,1) circle (1);</code>


Position du texte
<code>\draw[decorate,decoration={ text along path,text={texte},text align={align=left} }] (1,1) circle (1);</code>
  
<code>align={align=left }</code> <code>align={align=center }</code> <code>align={align=right }</code>

<code>\draw[ decorate,decoration={text along path,text={texte},text align={align=left,left indent=1cm} } ] (1,1) circle (1);</code>
 
<code>align={align=left,left indent=1cm}</code> <code>align={align=right,right indent=1cm}</code>

Justification du texte
<code>\draw [decoration={text along path, text={Un deux trois quatre },text align={fit to path}}, decorate] (1,1) circle (1);</code>


Justification des espaces
<code>\draw [decoration={text along path, text={Un deux trois quatre },text align={fit to path stretching spaces}}, decorate] (1,1) circle (1);</code>


## 18.7 Library “decorations.fractals”

Charger l'extension: `\usetikzlibrary{decorations.fractals}`

PGFmanual section : 48-7

<code>\draw[decorate,decoration=<b>Koch curve type 1</b>] (0,0) - - (3,0);</code>			
<b>Koch curve type 1</b>	<b>Koch curve type 2</b>	<b>Koch snowflake</b>	<b>Cantor set</b>

<code>\begin{tikzpicture}[decoration=Koch curve type 1]  \draw <b>decorate</b> { <b>decorate</b> { (0,0) - - (3,0) } };  \end{tikzpicture}</code>			
Koch curve type 1	Koch curve type 2	Koch snowflake	Cantor set

<code>\draw <b>decorate</b> { <b>decorate</b> { <b>decorate</b> { (0,0) - - (3,0) } } };</code>			
Koch curve type 1	Koch curve type 2	Koch snowflake	Cantor set

sans	1 decorate	2 decorate	3 decorate

## 18.8 Applications

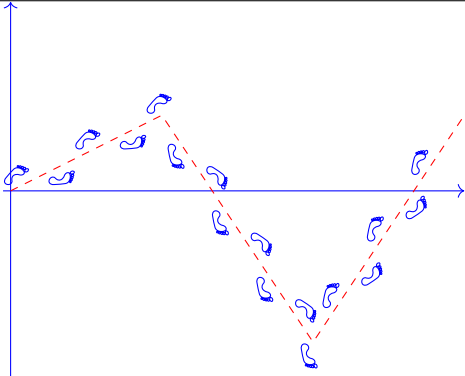
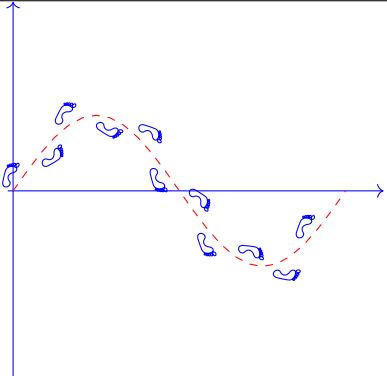
### 18.8.1 Décoration d'un nœud

\node [draw,decorate,decoration={bumps, minimum height=2cm, minimum width=3cm}] {texte};	
decoration= <b>bumps</b>	decoration= <b>footprints</b>
decoration={random steps , amplitude = 1pt }	starburst,decoration={random steps, segment length=3pt , amplitude=2pt }
ellipse,decoration=zigzag	decoration= {text along path,text= {Un Deux Trois Quatre Cinq Six Sept Huit Neuf} }

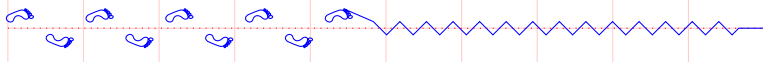
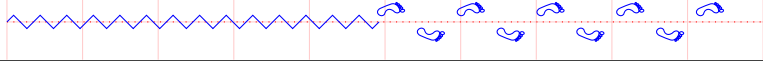
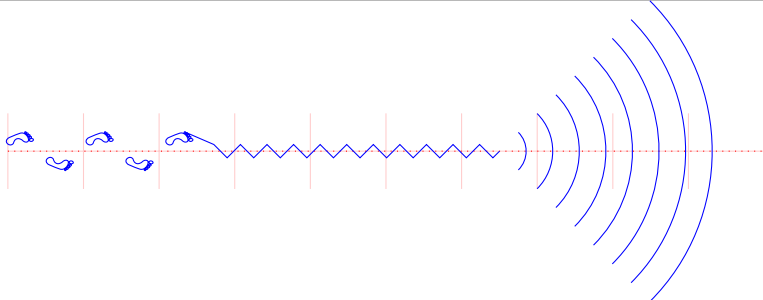
### 18.8.2 Décoration de liaisons de noeuds

\draw [decorate,decoration=sake](A) - (B);		
decoration=sake (A) - - (B)	decoration=coil (A)   - (B)	decoration=footprints (A) -   (B)
decoration=coil (A) to [bend right] (B)	decoration=zigzag (A) to[bend left=120] (B)	decoration=ticks (A) to[out=30] (B)

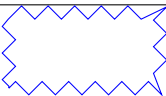


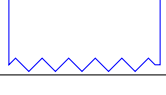
### 18.8.3 Décoration d'un graphe

<code>\draw [decorate,decoration=footprints] plot coordinates (0,0) (2,1) (4,-2) (6,1) ;</code>	
	
plot coordinates (0,0) (2,1) (4,-2) (6,1)	plot (\x,{sin(\x r)})

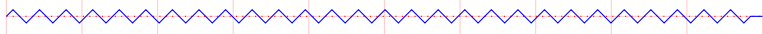
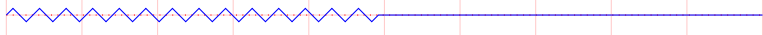
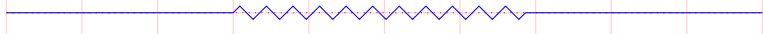
### 18.8.4 Décorations variables



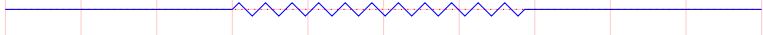
<code>\draw [decorate, decoration={zigzag,pre=footprints,pre length=5cm}](0,0) – (10,0);</code>	
	
<code>decoration={zigzag,pre=footprints,pre length=5cm}</code>	
	
<code>decoration={zigzag,post=footprints,post length=5cm}</code>	
	
<code>decoration={zigzag,pre=footprints,pre length=3cm, ,post=expanding waves,post length=3cm}</code>	

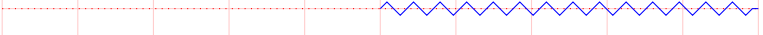
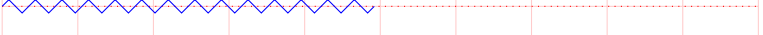

### 18.8.5 Décoration partielle

	<code>\draw [decorate,decoration=zigzag] (0,0) – (2,0) – (2,1) – (0,1)– cycle;</code>
	<code>\draw [decoration=zigzag] (0,0) – (2,0) decorate{– (2,1)} – (0,1)– cycle;</code>
	<code>\draw [decorate,decoration=zigzag] (0,0) – (2,0) – (2,1) – decorate{(0,1)}– cycle;</code>
	<code>\draw [decorate,decoration=zigzag] (0,0) decorate{– (2,0)} – (2,1) – decorate{(0,1)}– cycle;</code>

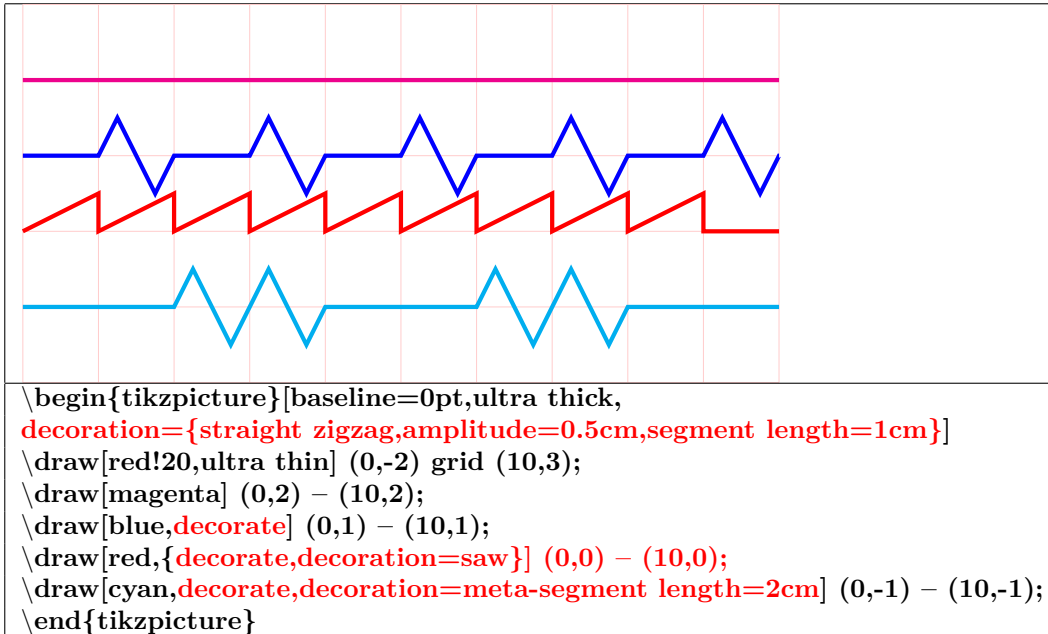


“lineto” \draw [decorate, decoration={zigzag,lineto, <b>pre length=5cm</b> }] (0,0) – (10,0);

decoration={ zigzag, <b>pre=lineto</b> , <b>pre length=5cm</b> }

decoration={zigzag, <b>post=lineto</b> , <b>post length=5cm</b> }

decoration={zigzag, <b>pre=lineto</b> , <b>pre length=3cm</b> , , <b>post=curveto</b> , <b>post length=3cm</b> }

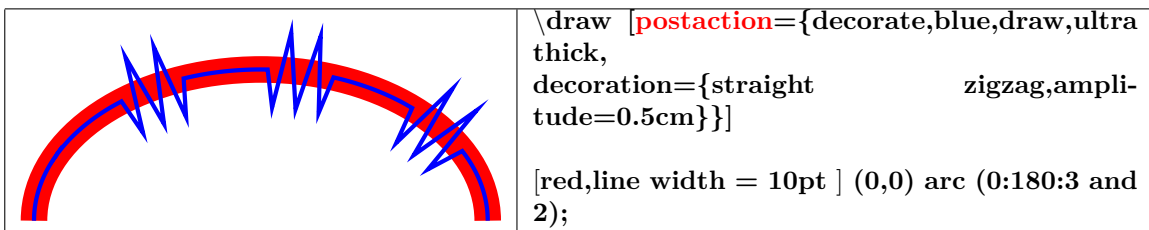
“curveto”
\draw [decorate, decoration={zigzag, <b>pre=curveto</b> , <b>pre length=5cm</b> }] (0,0) – (10,0);

decoration={zigzag, <b>pre=curveto</b> , <b>pre length=5cm</b> }

decoration={zigzag, <b>post=curveto</b> , <b>post length=5cm</b> }

decoration={zigzag, <b>pre=curveto</b> , <b>pre length=3cm</b> , , <b>post=curveto</b> , <b>post length=3cm</b> }

“moveto”
\draw [decorate, decoration={zigzag, <b>pre=moveto</b> , <b>pre length=5cm</b> }] (0,0) – (10,0);

decoration={zigzag, <b>pre=moveto</b> , <b>pre length=5cm</b> }

decoration={zigzag, <b>post=moveto</b> , <b>post length=5cm</b> }

decoration={zigzag, <b>pre=moveto</b> , <b>pre length=3cm</b> , , <b>post=moveto</b> , <b>post length=3cm</b> }

### 18.8.6 Paramètres globaux ou particuliers

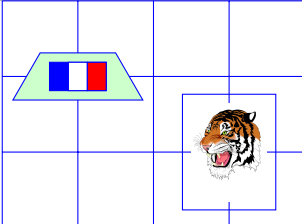


### 18.8.7 Tracer le chemin et sa décoration avec “Postaction”

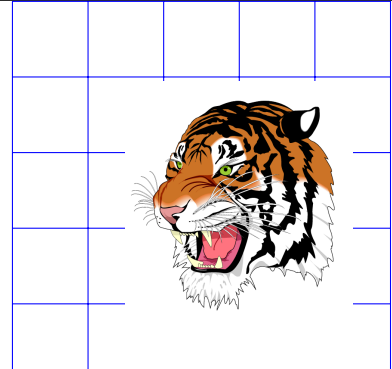


## 19 Insertion images dans un environnement TikZ

### 19.0.1 Dans un noeud

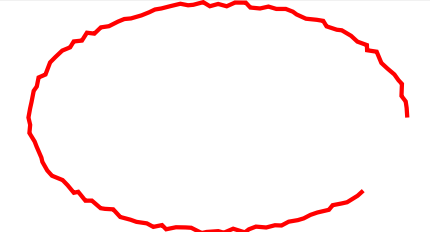
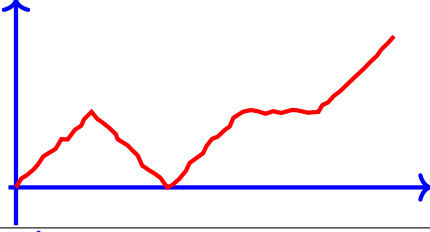
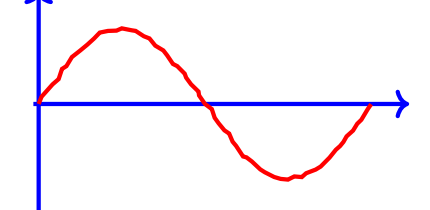
	<pre> \begin{tikzpicture} \draw (0,0) grid (5,3); \node [fill=green!20,trapezium,draw] at (1,2) {\DFR }; 71 \node [draw] at (3,1) {\includegraphics[width=1cm]{tiger} }; \end{tikzpicture} </pre>
---	---

### 19.0.2 En déclarant l'image dans pgf

	<pre> \pgfdeclareimage[width=3cm]{ttt}{tiger}  \begin{tikzpicture} \draw (0,0) grid (5,5); \draw (3,2) node {\pgfuseimage{ttt}} ; \end{tikzpicture} </pre>
--	--

## 20 Trait à main levée

voir page 90

	<pre> \draw[decorate,decoration={random steps, amplitude=1pt,segment length=3pt}] (0,0) arc (0:320:2.5 and 1.5); </pre>
	<pre> \draw[decorate,decoration={random steps, amplitude=1pt,segment length=3pt}] plot coordinates (0,0) (1,1) (2,0) (3,1) (4,1) (5,2); </pre>
	<pre> \draw[decorate, decoration={random steps, amplitude=1pt,segment length=3pt}] plot (\x,\sin(\x r)); </pre>

## 21 Effets spéciaux

### 21.1 Le peuple TikZ

Charger l'extension: `\usepackage{tikzpeople}` [4]

`\tikz \node[alice] at (0,0) ;`



#### 21.1.1 Personages disponibles

<code>\tikz \node[alice,minimum size=1.5cm] at (0,0) ;</code>						
alice	bob	bride	builder	businessman	charlie	chef
conductor	cowboy	criminal	dave	graduate	groom	guard
jester	judge	mexican	nun	nurse	physician	pilot
police	priest	sailor	santa	surgeon		

#### 21.1.2 Options

<code>\tikz \node[businessman,evil,minimum size=1.5cm] at (0,0) ;</code>				
evil	female	good	mirrored	monitor

### 21.1.3 Point d'ancrage spécifique

	<pre>\begin{tikzpicture}[blue] \node[name=a,shape=bob,minimum size=1.5cm] {}; \node at (1.25,.5) [ellipse callout, draw, callout absolute pointer{(a.mouth)}, font=\tiny] Hey!; \end{tikzpicture}</pre>
--	---

### 21.1.4 Couleurs





\tikz \node[alice, hair=red, minimum size=1.5cm] at (0,0) ;			
hair=red	skin=red	shirt=red	details=red






\tikz \node[bob, hair=red, minimum size=1.5cm] at (0,0) ;			
hair=red	skin=red	shirt=red	details=red










\tikz \node[bride, hair=red, minimum size=1.5cm] at (0,0) ;				
hair=red	skin=red	shirt=red	pearls=red	veil=red









\tikz \node[builder, hair=red, minimum size=1.5cm] at (0,0) ;				
hair=red	skin=red	shirt=red	trousers=red	hat=red





\tikz \node[businessman, hair=red, minimum size=1.5cm] at (0,0) ;					
hair=red	skin=red	shirt=red	tie=red	undershirt=red	monogram=red






\tikz \node[charlie,hair=red,minimum size=1.5cm] at (0,0) ;			
			
hair=red	skin=red	shirt=red	buttons=red







\tikz \node[chef,hair=red,minimum size=1.5cm] at (0,0) ;				
				
hair=red	skin=red	shirt=red	hat=red	details=red







\tikz \node[conductor,hair=red,minimum size=1.5cm] at (0,0) ;				
				
hair=red	skin=red	shirt=red	hat=red	hatshield=red
				
undershirt=red	shirt=red	hatbadge=red	badge=red	

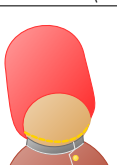
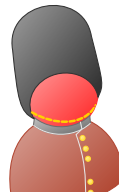
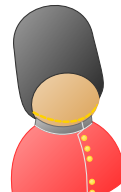
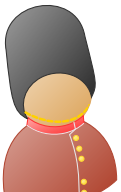
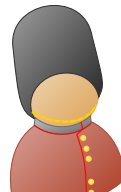
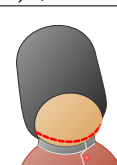
\tikz \node[cowboy,hair=red,minimum size=1.5cm] at (0,0) ;			
			
hair=red	skin=red	shirt=green	hat=red
			
patches=red	tie=green	stitching=red	vest=red







\tikz \node[criminal,hair=red,minimum size=1.5cm] at (0,0) ;			
			
hat=red	skin=red	shirt=red	details=red




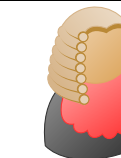
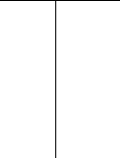
\tikz \node[dave,hair=red,minimum size=1.5cm] at (0,0) ;				
				
hair=red	skin=red	shirt=red	undershirt=green	tie=green




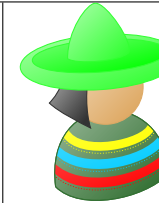
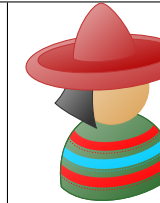
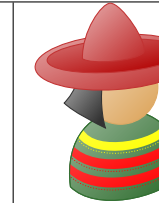

\tikz \node[graduate,hair=red,minimum size=1.5cm] at (0,0) ;					
					
hair=red	skin=red	shirt=red	undershirt=red	stripes=red	hat=red

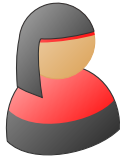

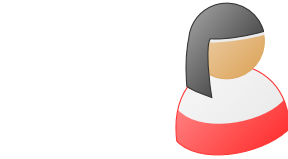
\tikz \node[groom,hair=red,minimum size=1.5cm] at (0,0) ;					
					
hair=red	skin=red	shirt=red	undershirt=green	tie=green	hat=red

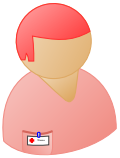
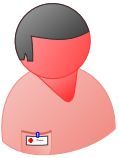
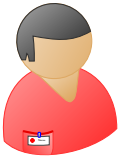
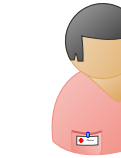


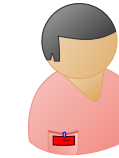
\tikz \node[guard,hair=red,minimum size=1.5cm] at (0,0) ;					
					
hat=red	skin=red	shirt=red	collar=red	lining=red	details=red






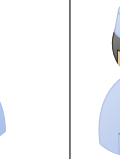
\tikz \node[jester,hair=red,minimum size=1.5cm] at (0,0) ;					
					
hair=red	skin=red	shirt=yellow	hat=red	pattern=yellow	details=blue








\tikz \node[judge,hair=red,minimum size=1.5cm] at (0,0) ;				
				
hair=red	skin=red	shirt=red	undershirt=red	hairshadow=red

\tikz \node[mexican,hair=red,minimum size=1.5cm] at (0,0) ;						
						
hair=red	skin=red	shirt=red	hat=green	ringtop=red	ringmid=red	ringbot=yellow

\tikz \node[nun,plaid=red,minimum size=1.5cm] at (0,0) ;		
		
plaid=red	skin=red	shirt=red

\tikz \node[nurse,hair=red,minimum size=1.5cm] at (0,0) ;						
						
hair=red	skin=red	shirt=red	badgeclip=green	redcross=green	badge=red	badgenam" data-bbox="795 510 870 580"/>

\tikz \node[physician,hair=red,minimum size=1.5cm] at (0,0) ;					
					
hair=red	skin=red	shirt=red	hat=red	stethoscope=red	tube=red

\tikz \node[pilot,hat=red,minimum size=1.5cm] at (0,0) ;						
						
hat=red	skin=red	shirt=red	undershirt=red	visor=red	straps=red	decoration=red



\tikz \node[police, hair=red, minimum size=1.5cm] at (0,0) ;			
hair=red	skin=red	shirt=red	hat=red
badge=red	hatbadge=red	hatshield=red	undershirt=red

\tikz \node[priest, hair=red, minimum size=1.5cm] at (0,0) ;					
hair=red	skin=red	shirt=red	hat=red	collar=red	cross=red

\tikz \node[sailor, hair=red, minimum size=1.5cm] at (0,0) ;						
hair=red	skin=red	shirt=red	hat=red	undershirt=red	stripes=red	details=red

\tikz \node[santa, hat=green, minimum size=1.5cm] at (0,0) ;				
hat=green	skin=green	shirt=green	beard=green	details=green

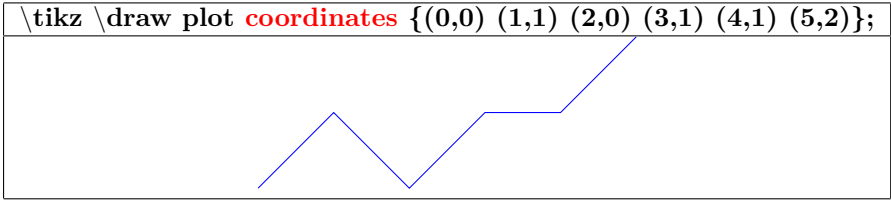
\tikz \node[surgeon, hat=red, minimum size=1.5cm] at (0,0) ;				
hat=red	skin=red	shirt=red	hair=red	mask=red

# 22 Créer un graphe

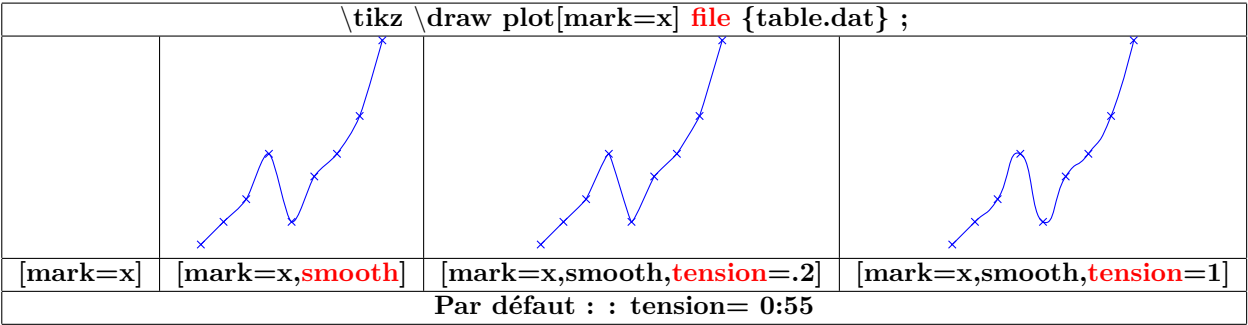
## 22.1 Graphe avec TikZ

### 22.1.1 Graphe à partir d'une liste de points

PGFmanual section : 22-2



### 22.1.2 Graphe à partir d'un fichier de données



Contenu du fichier table.dat	
0.0	0.3
0.3	0.6
0.6	0.9
0.9	1.5
1.2	0.6
1.5	1.2
1.8	1.5
2.1	2.0
2.4	3.0

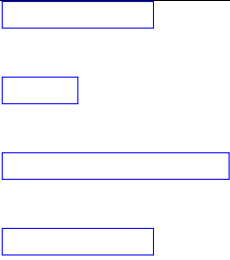
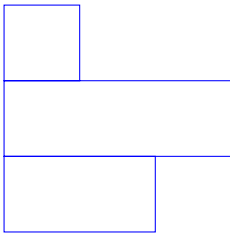
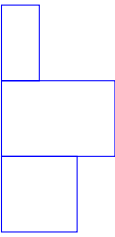
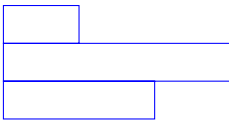
### 22.1.3 Les types de graphes

\tikz \draw plot[mark=*,const plot] file {table.dat} ;			
const plot	const plot mark left	const plot mark right	jump mark left
jump mark right	ycomb	xcomb	only marks

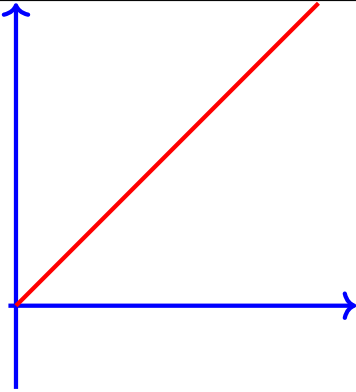
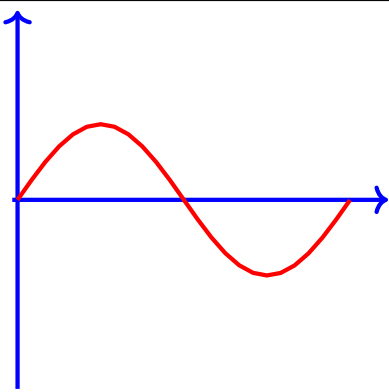
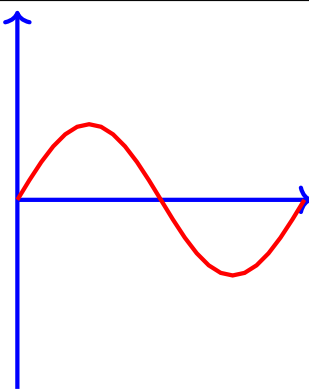
\tikz \draw plot[polar comb,mark=*]coordinates {(0:1) (60:0.5) (120:1.5) (180:3) (240:.5) (300:1) (0:1)};

\tikz \draw plot[ybar] file {table.dat} ;			
[ybar]	[ybar interval]	[ybar interval,x=2cm]	[ybar interval,y=.5cm]

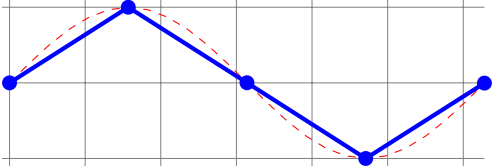
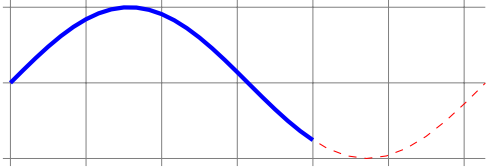
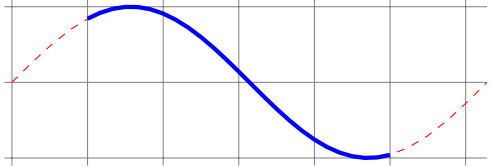
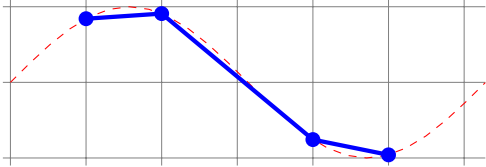
	<pre> \begin{tikzpicture} \draw[red,fill=cyan,ybar,bar width=.5cm]   plot coordinates {(0,1) (1,1.2) (2,.6) (3,.7) (4,.9)}; \draw[blue,fill=green,ybar,bar                                 width=.5cm,bar                                 shift=.3cm]   plot coordinates {(0,1.2) (1,1.3) (2,.5) (3,.2)                     (4,.5)}; \end{tikzpicture} </pre>
--	---

\tikz \draw plot[xbar interval] file {table.dat} ;			
			
[xbar]	[xbar interval]	[xbar interval,x=.5cm]	[xbar interval,y=.5cm]

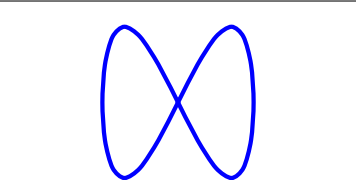
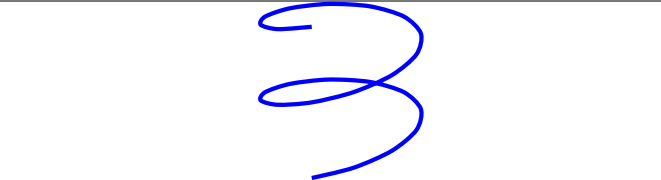
### 22.1.4 Graphe à partir d'une fonction

<code>\draw [color=red] plot (\x,\x);</code>		
		
$(\backslash x, \backslash x)$	$(\backslash x, \{\sin(\backslash x \text{ r})\})$ x en radian	$(\backslash x, \{\sin(\backslash x)\})$ x en degré

#### Options

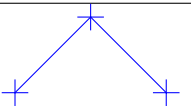
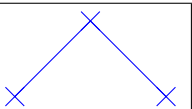
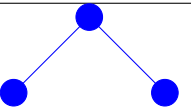
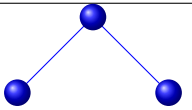
<code>\draw[color=red,dashed] plot(\x,{sin(\x r)});</code> <code>\draw[color=blue,samples=5,mark=*,ultra thick] plot(\x,{sin(\x r)});</code>			
			
<code>[color=blue,samples=5,mark=*]</code>	<code>[color=blue,domain=0:4]</code>		
			
<code>[color=blue,domain=1:5]</code>	<code>[color=blue,samples at={1,2,4,5},mark=*]</code>		

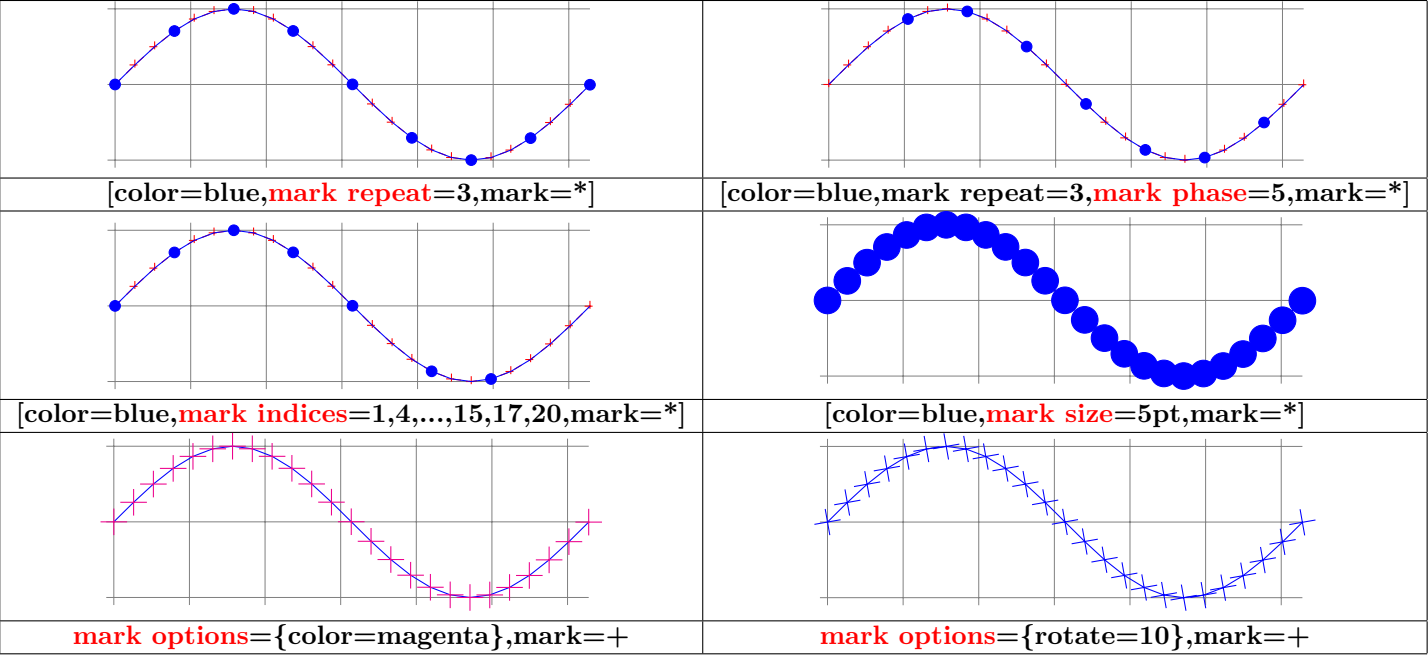
### 22.1.5 Fonctions paramétriques

<code>\draw[domain=-3.141:3.141,smooth,variable=\t]plot ({sin(\t r)},{sin(2 *\t r)});</code> <code>\draw[domain=0:720,smooth,variable=\t]plot ({sin(\t)},{\t/360},{cos(\t)});</code>	
	
$(\{\sin(\backslash t \text{ r})\}, \{\sin(2 *\backslash t \text{ r})\})$	$(\{\sin(\backslash t)\}, \backslash t/360, \{\cos(\backslash t)\})$

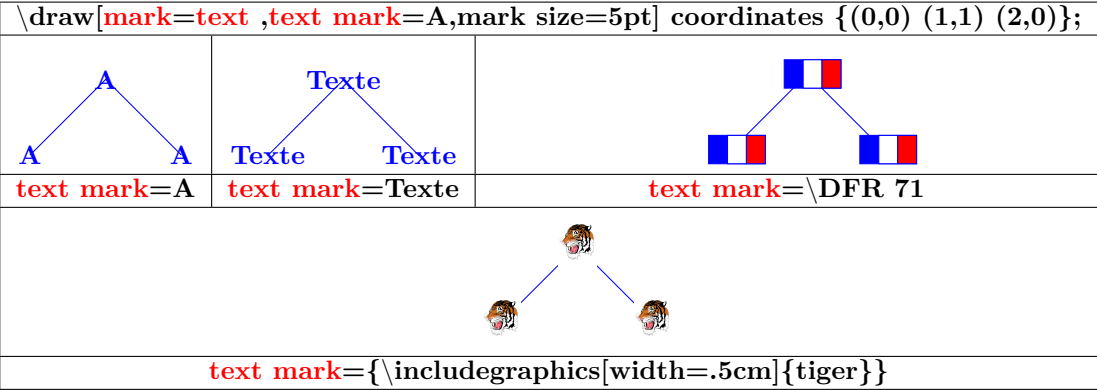
## 22.2 Marques

### 22.2.1 Marques avec TikZ

			
<code>mark=+</code>	<code>mark=x</code>	<code>mark=*</code>	<code>mark=ball</code>



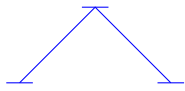
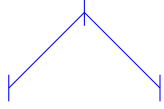
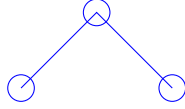
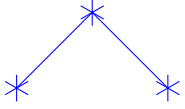
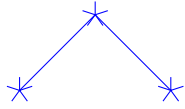
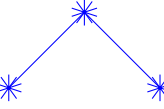
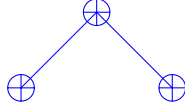
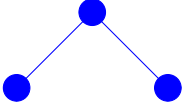
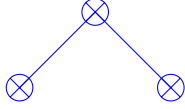
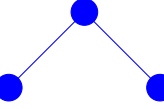
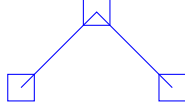
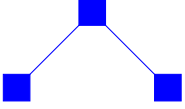
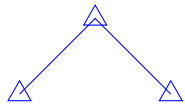
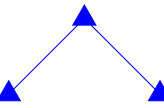
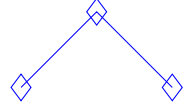
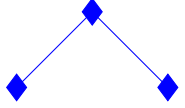
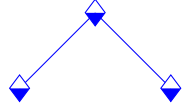
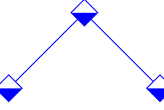
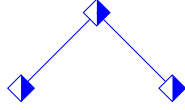
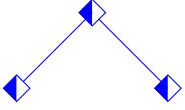
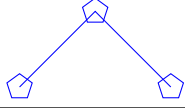
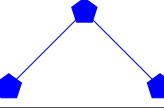
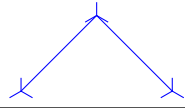
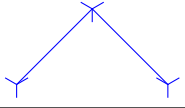
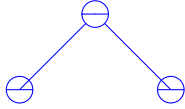
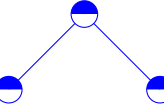
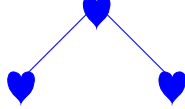
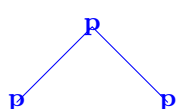
22.2.2 Marques personnalisées avec text mark



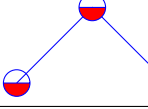
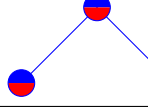
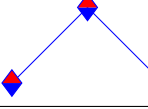
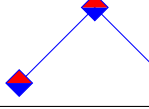
### 22.2.3 Marques avec l'extension plotmarks

Charger l'extension: `\usetikzlibrary{plotmarks}`

PGFmanual section : 63

			
mark=-	mark=	mark=o	mark=asterisk
			
mark=star	mark=10-pointed star	mark=oplus	mark=oplus*
			
mark=otimes	mark=otimes*	mark=square	mark=square*
			
mark=triangle	mark=triangle*	mark=diamond	mark=diamond*
			
mark=halfdiamond*	mark=halfsquare*	mark=halfsquare right*	mark=halfsquare left*
			
mark=pentagon	mark=pentagon*	mark=Mercedes star	mark=Mercedes star flipped
			
mark=halfcircle	mark=halfcircle*	mark=heart	mark=text

`\draw[mark=halfcircle,mark color=red,mark size=5pt] coordinates {(0,0) (1,1) (2,0)};`

			
mark=halfcircle	mark=halfcircle*	mark=halfdiamond*	mark=halfsquare*

### 22.3 Graphes avec Gnuplot

`\draw[color=red] plot[id=sin] function{sin(x)} ;`

==> `plot[id=sin]` crée le fichier "sin.gnuplot"

==> Ouvrir le fichier "sin.gnuplot" avec le programme gnuplot pour créer le fichier "sin.table"

==> Utiliser le fichier de données "sin.table"

## 23 Créer un graphe avec pgfplot

Charger l'extension: `\usepackage{pgfplots}` [2]

### 23.1 Courbes 2 D

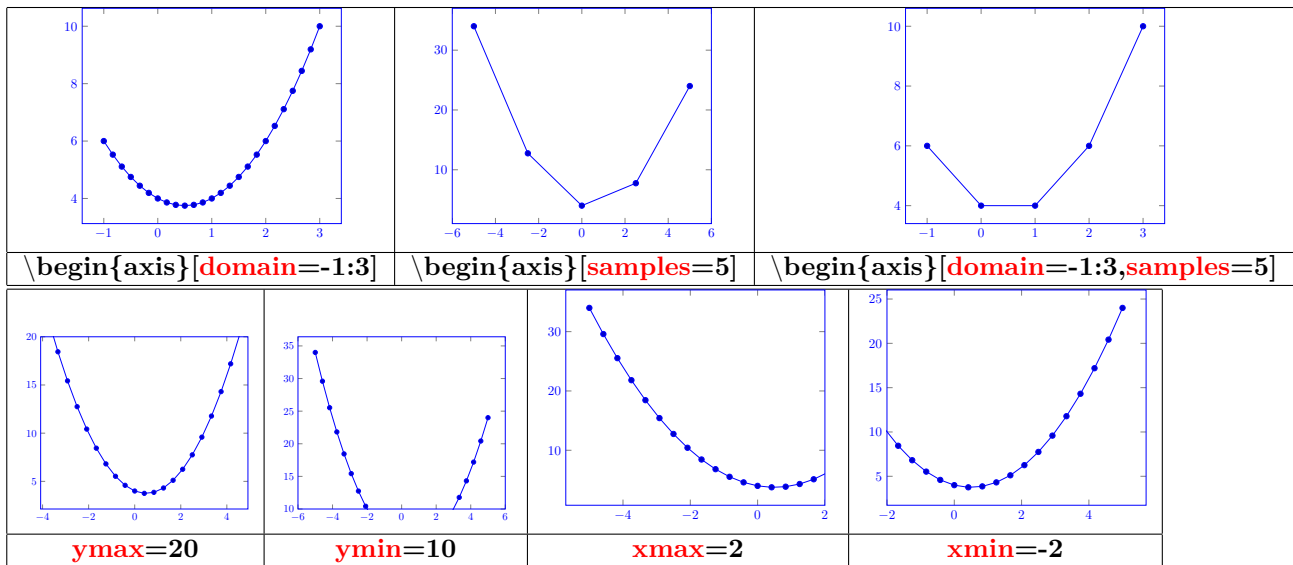
#### 23.1.1 Axes

pgfplots section : 4-1			
<code>\begin{axis}</code>	<code>\begin{semilogxaxis}</code>	<code>\begin{semilogyaxis}</code>	<code>\begin{loglogaxis}</code>
<code>\end{axis}</code>	<code>\end{semilogxaxis}</code>	<code>\end{semilogyaxis}</code>	<code>\end{loglogaxis}</code>

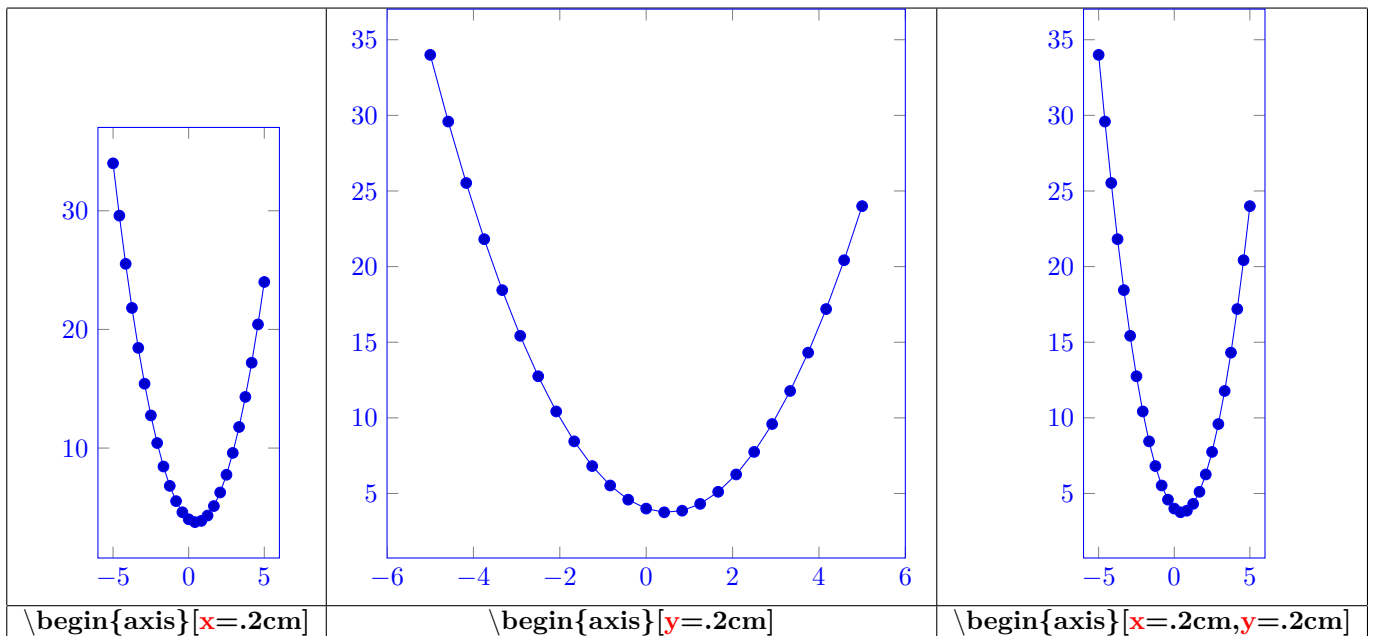
#### 23.2 Tracé de la courbe

pgfplots section : 4-2		
<code>\addplot coordinates {(0,0) (1,1) (2,0) (3,1) (4,1) (5,2)};</code>	<code>\addplot {x^2 - x +4};</code>	<code>\addplot gnuplot[id=sin]{sin(x)};</code>
axes : <b>semilogxaxis</b>	axes : <b>semilogxaxis</b>	axes : <b>semilogyaxis</b>
<code>\addplot coordinates {(0,0) (1,1) (2,0) (3,1) (4,1) (5,2)};</code>	<code>\addplot {x^2 - x +4};</code>	<code>\addplot {x^2 - x +4};</code>

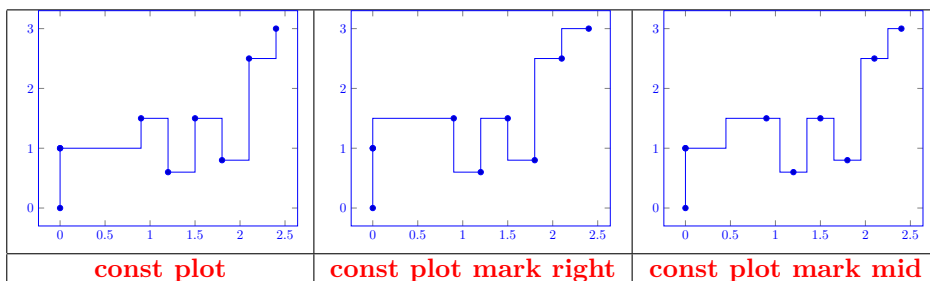


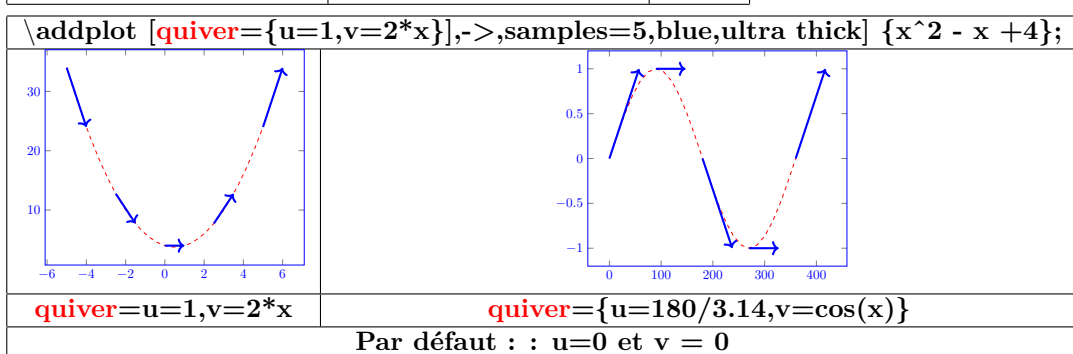
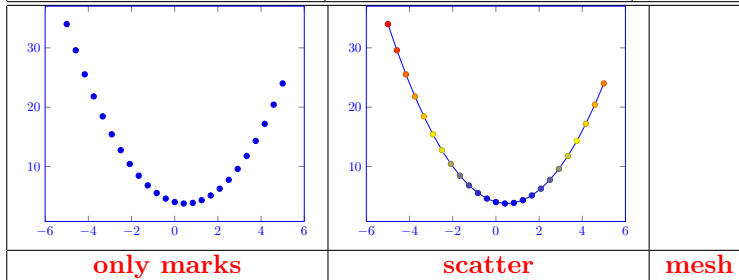
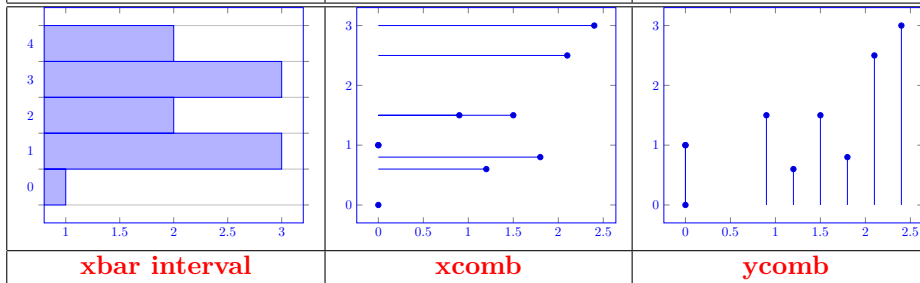
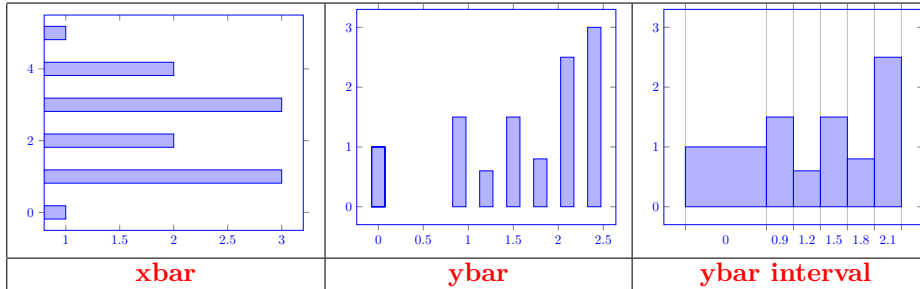
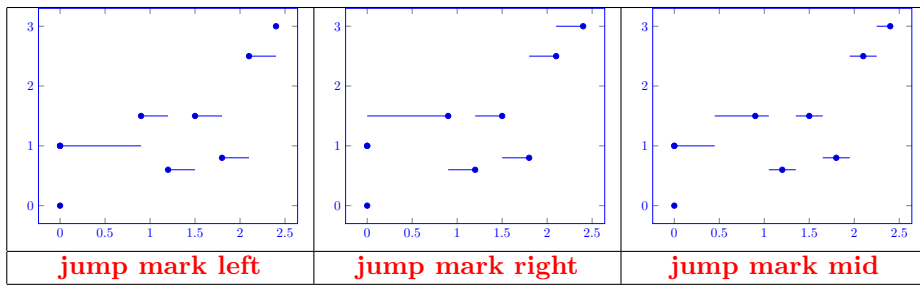


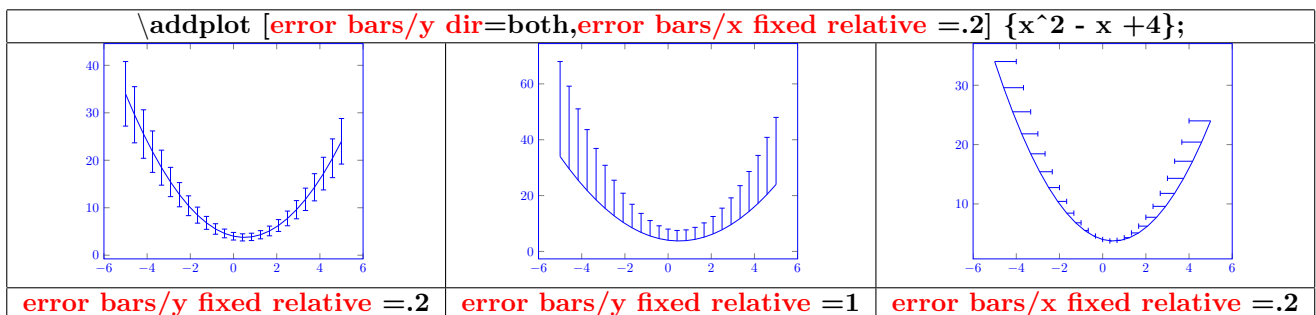
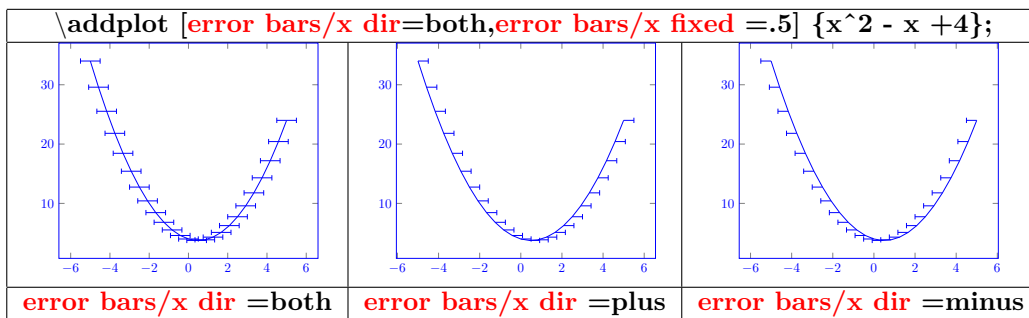
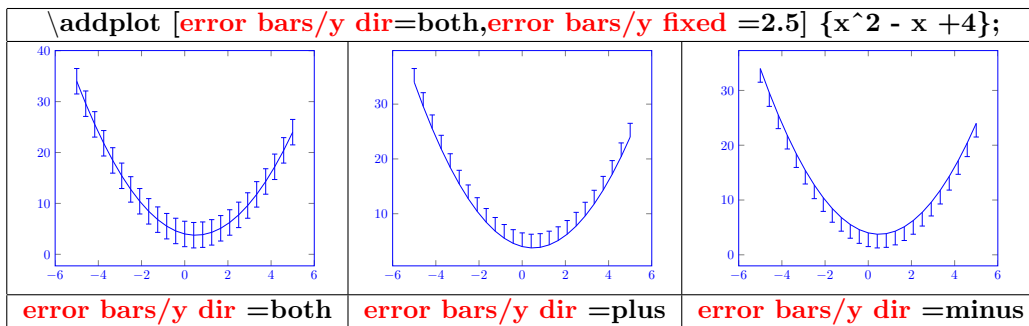
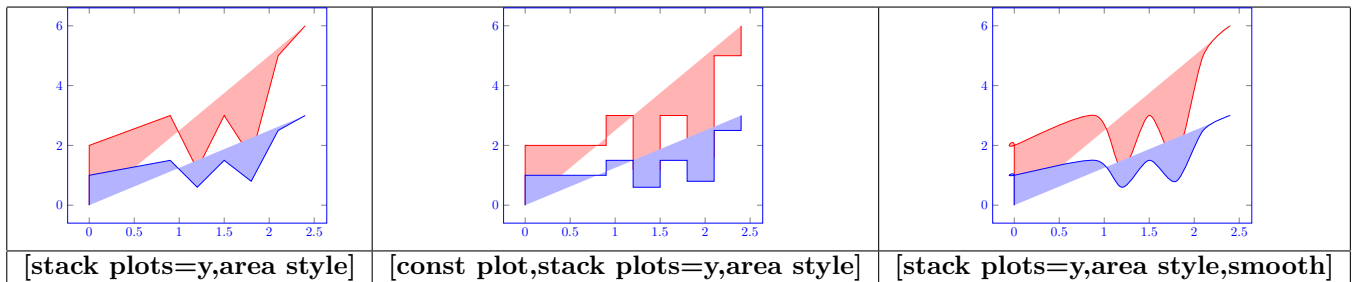
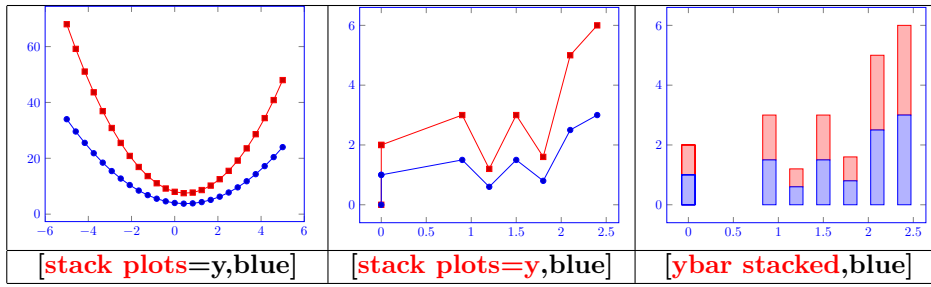
### 23.2.1 Dimension unitaire en X et Y



### 23.2.2 Type de graphiques

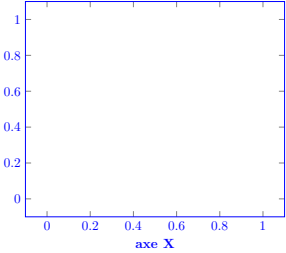
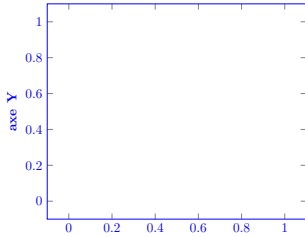
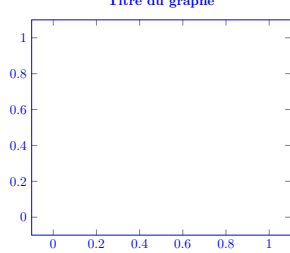




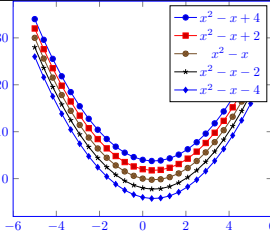
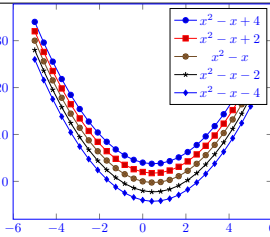


## 23.3 Habillage du graphe

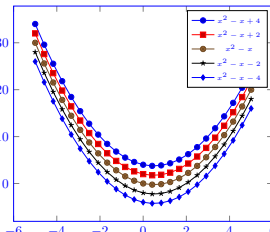
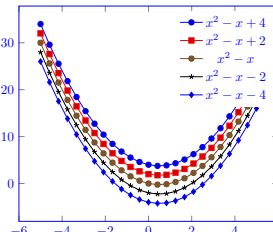
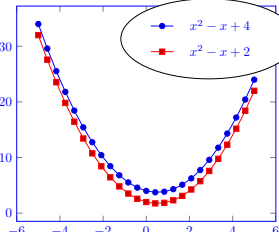
### 23.3.1 Titres

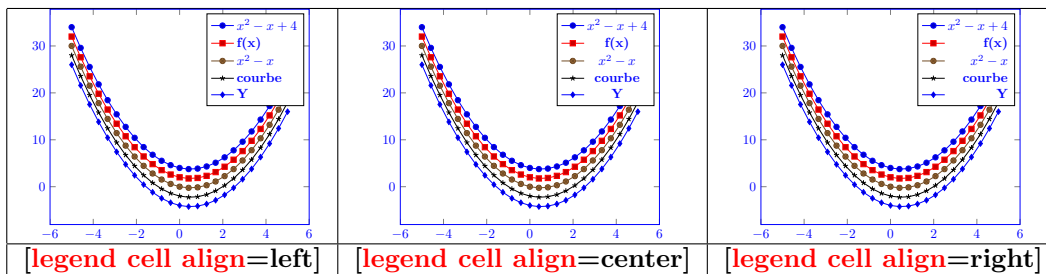
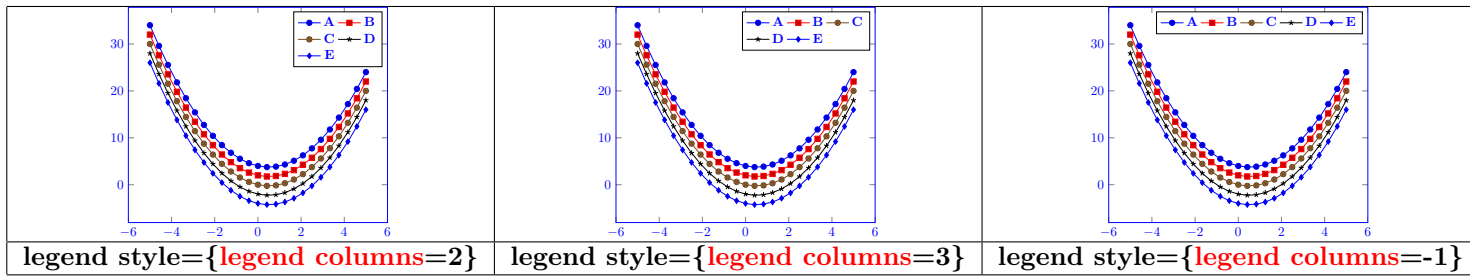
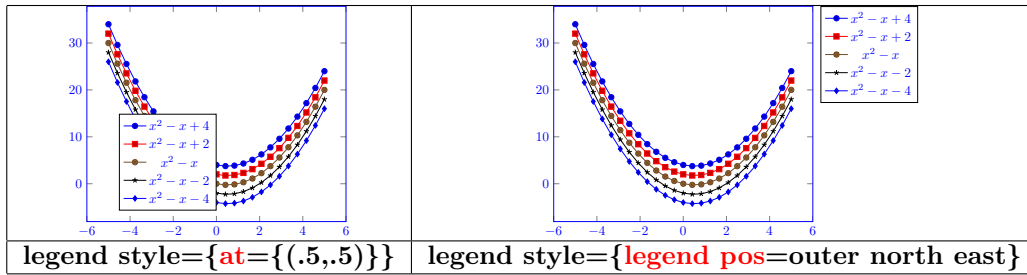
		
<code>\begin{axis}[xlabel=axe X]</code>	<code>\begin{axis}[ylabel=axe Y]</code>	<code>\begin{axis}[title=Titre du graphe]</code>

### 23.3.2 Légende

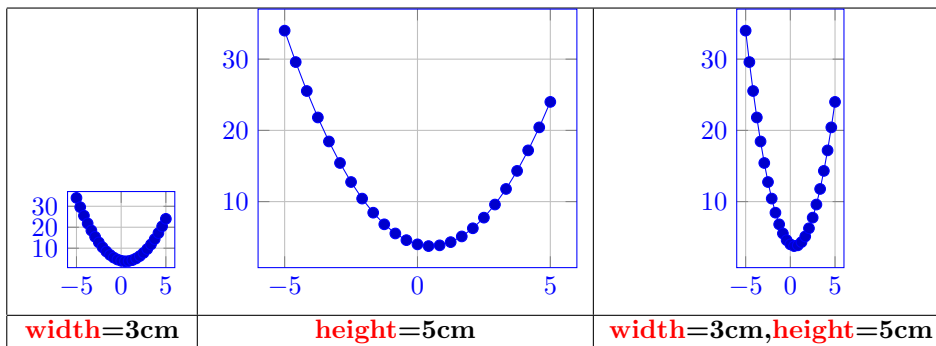
	<pre> \begin{axis} \addplot {x^2 - x + 4}; \addplot {x^2 - x + 2}; \addplot {x^2 - x}; \addplot {x^2 - x - 2}; \addplot {x^2 - x - 4};  \legend{\$x^2 - x + 4\$, \$x^2 - x + 2\$, \$x^2 - x\$, \$x^2 - x - 2\$, \$x^2 - x - 4\$} \end{axis} </pre>
	<pre> \begin{axis}[legend entries = { \$ x^2 - x + 4 \$, \$ x^2 - x + 2 \$, \$ x^2 - x \$, \$ x^2 - x - 2 \$, \$ x^2 - x - 4 \$ } ]  \addplot {x^2 - x + 4}; \addplot {x^2 - x + 2}; \addplot {x^2 - x}; \addplot {x^2 - x - 2}; \addplot {x^2 - x - 4}; \end{axis} </pre>

#### Options

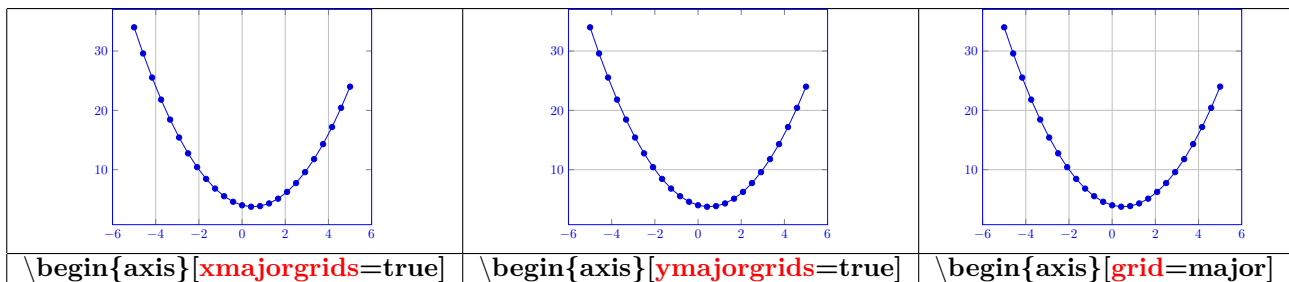
		
<code>legend style={font=\tiny}</code>	<code>legend style={draw=none}</code>	<code>legend style={shape=ellipse}</code>

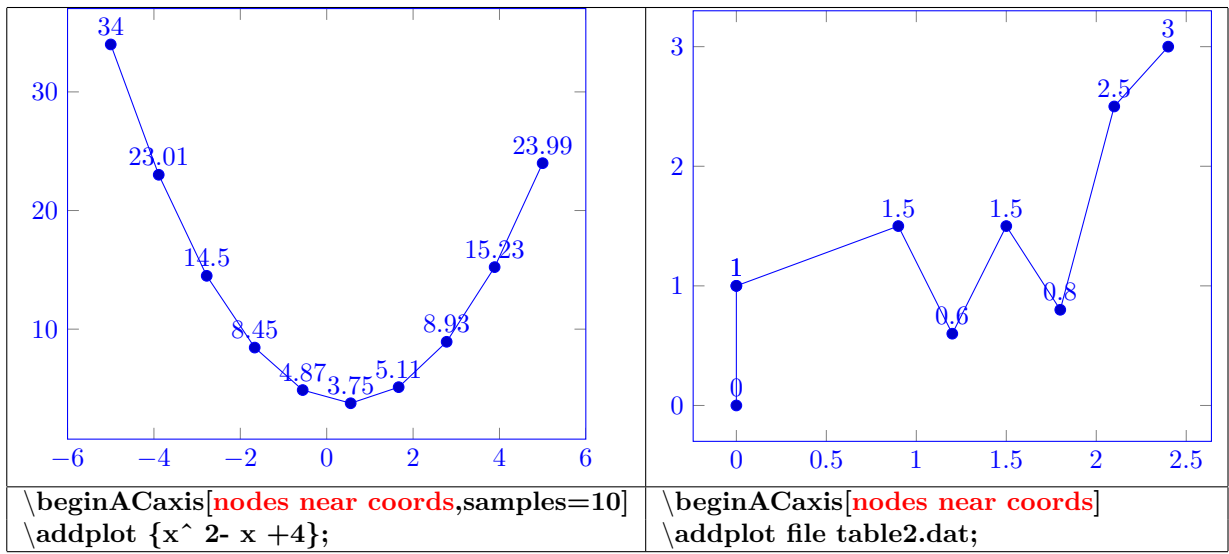


### 23.3.3 Taille du graphe



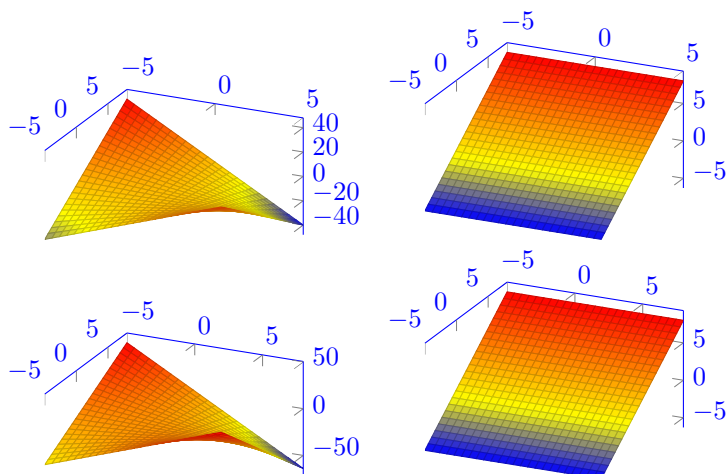
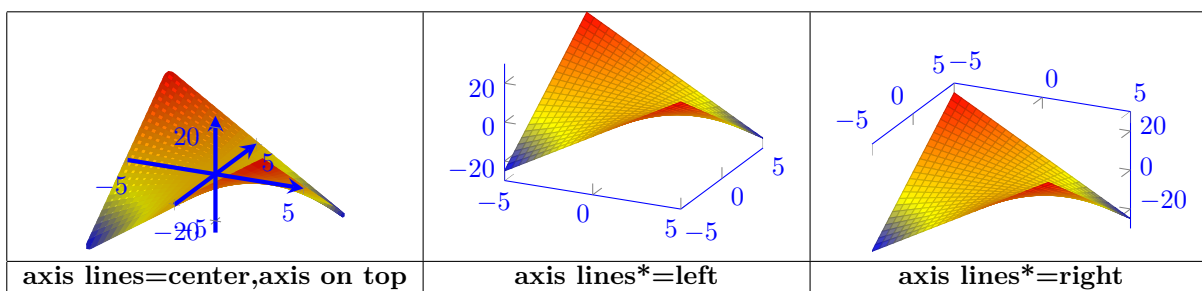
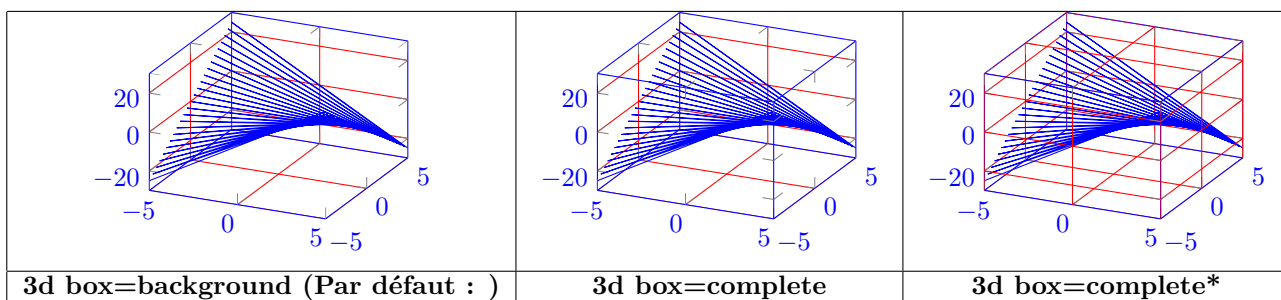
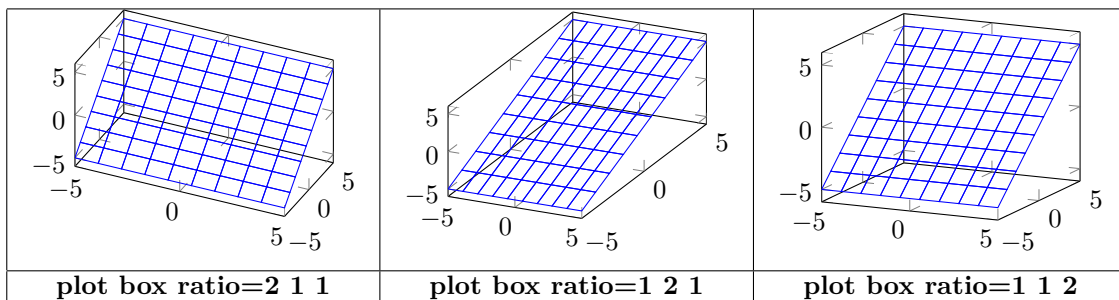
### 23.3.4 Quadrillage



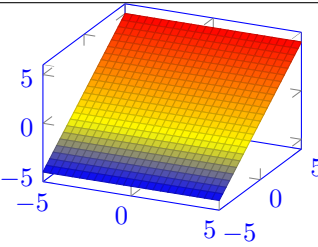
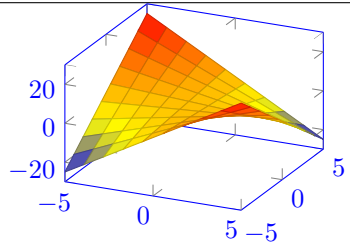


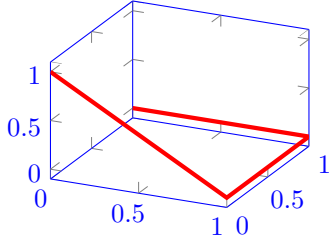
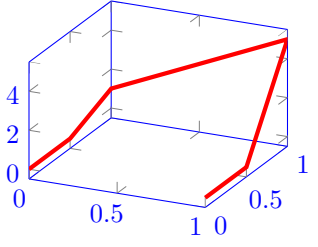
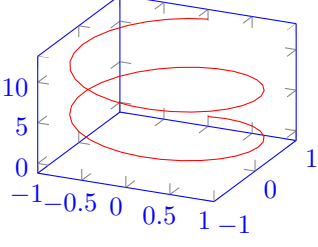
## 24 Courbes 3D

### 24.0.1 Axes



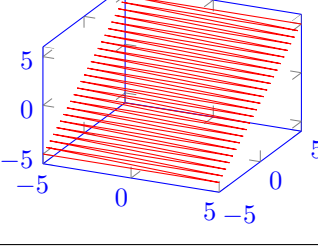
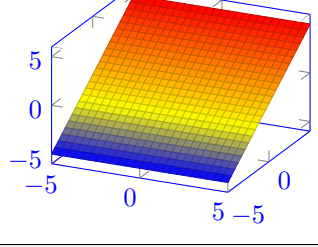
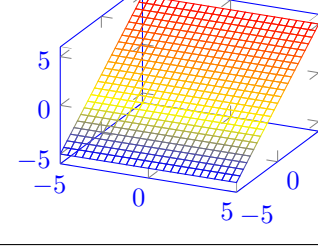
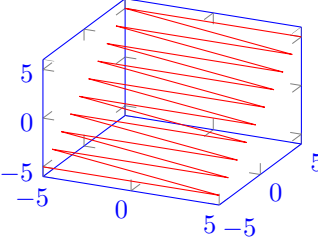
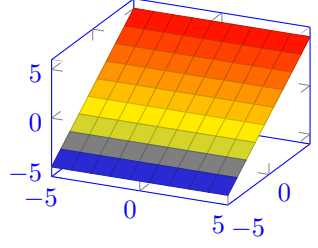
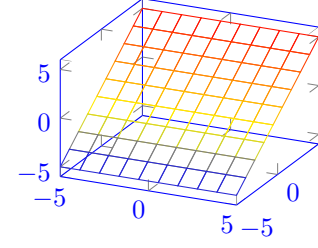
24.0.2 Tracé de la courbe

\addplot3 [surf] {y};		
		
{y}	{-x*y}	gnuplot[id=sinxy]{sin(x)*sin(y)};

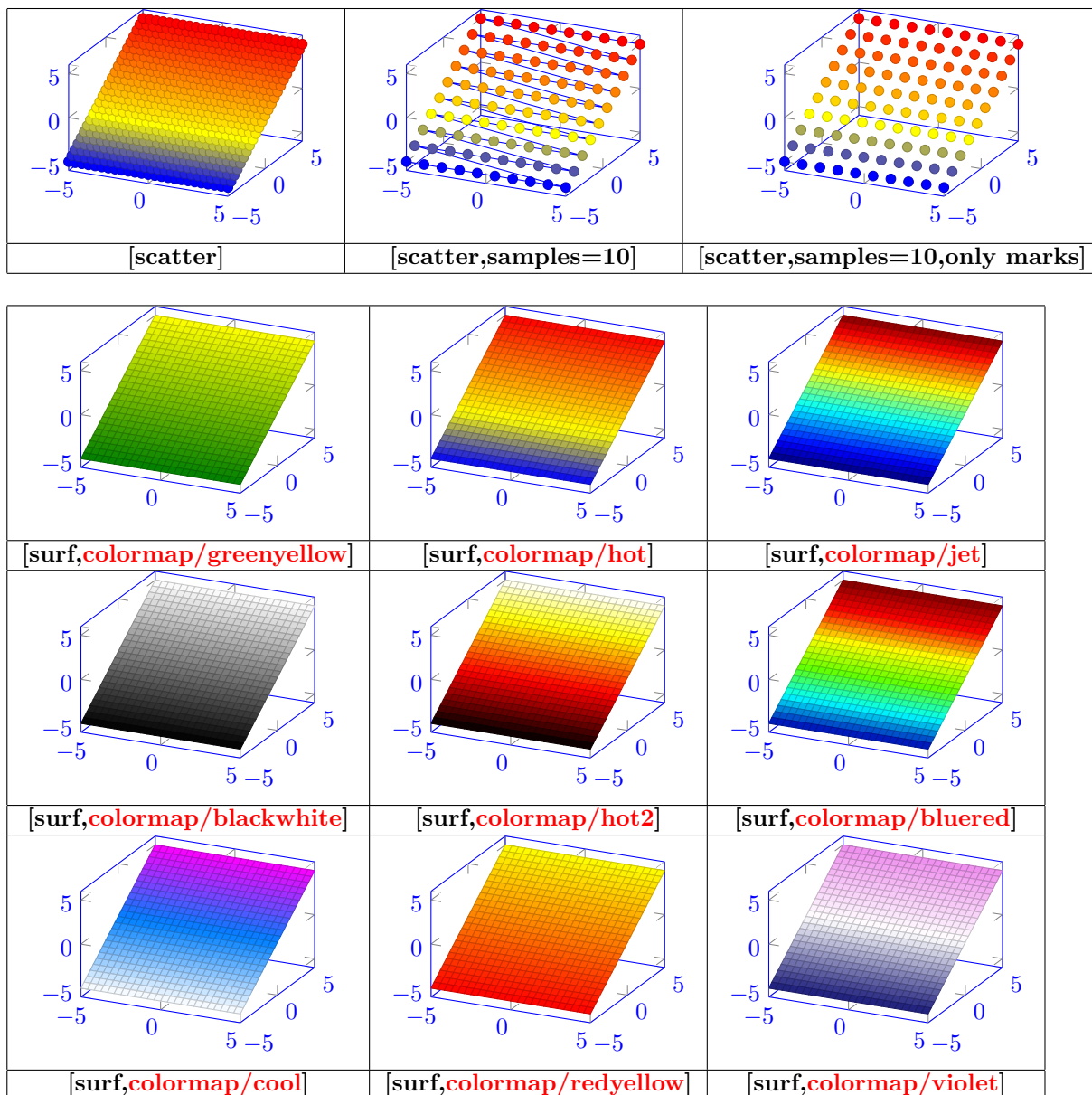
		
coordinates {(0,0,1) (1,0,0) (1,1,0) (0,1,0)};	file {table3.dat};	{sin(x)},{cos(x)},{x/60}};

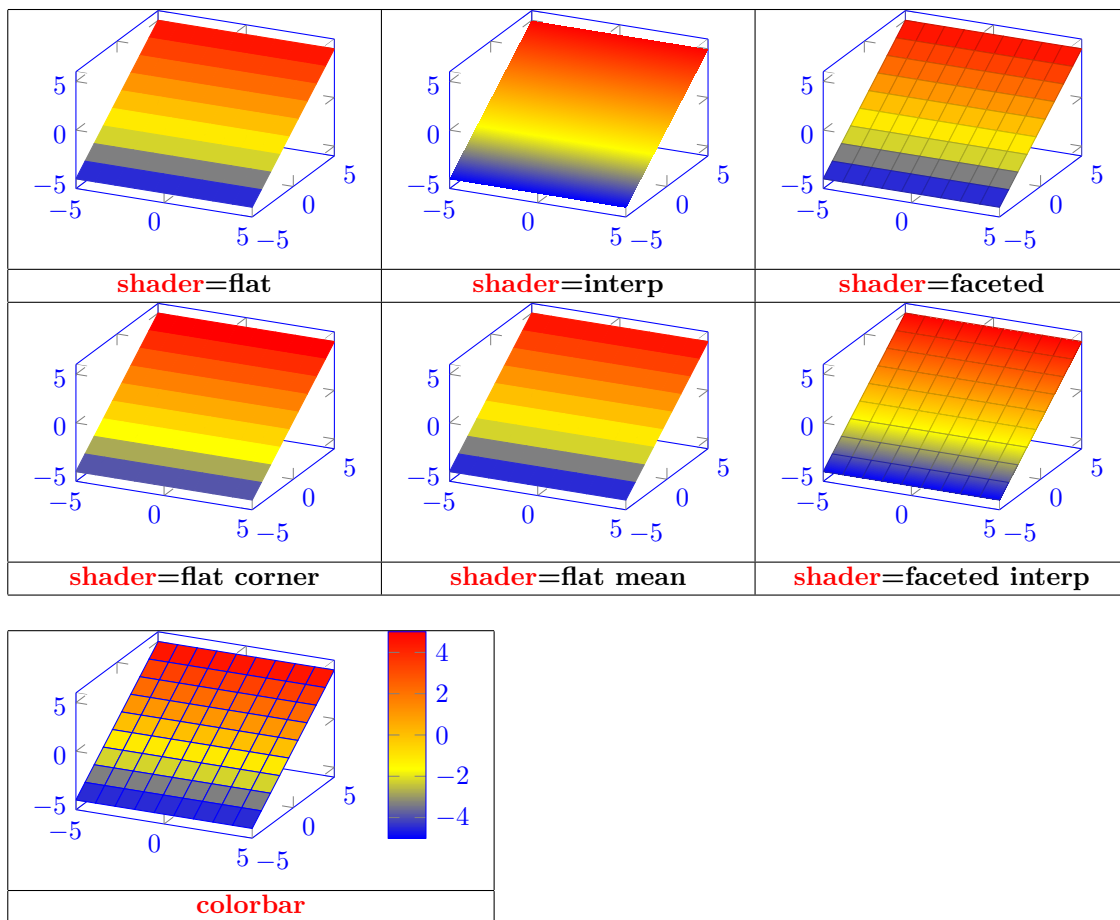
Contenu du fichier table3.dat		
0	0	0
0	0.5	0
0	1	1
1	1	5
1	0.5	0
1	0	0

24.0.3 Aspect

		
[red]	[surf]	[mesh]
		
[red,samples=10]	[surf,samples=10]	[mesh,samples=10]







#### 24.0.4 Point de vue

**Azimut**  
**view/az**= angle de - 50 à +50

**Elévation**  
**view/el**= angle de - 50 à +50

## 25 Les Tableaux de variation

Charger l'extension: `\usepackage{tkz-tab}` [3]

### 25.1 Déclaration du tableau

1° ligne	a	b	c
2° ligne			

```

\begin{tikzpicture}
\tkzTabInit{1° ligne / 1 , 2° ligne / 1 } { a , b , c }
\end{tikzpicture}

```

#### 25.1.1 Options

Hauteur des ligne			
1° ligne	a	b	c
2° ligne			
3° ligne			

```

\tikz \tkzTabInit{1° ligne '/1 , 2° ligne /.5 , 3° ligne /1.5 }{a , b , c };

```

Largeur de la première colonne			
$x$	a	b	c

```

\tkzTabInit[lgt=4]{  $x$  / 1}{ a , b , c };
Par défaut : : lgt==2 cm

```

Espace entre deux valeurs			
$x$	a	b	c

```

\tkzTabInit[espcl=1]{  $x$  / 1}{ a , b , c };
Par défaut : : espcl=2 cm

```

Marge de début et de fin			
$x$	a	b	c

```

\tkzTabInit[deltacl=1]{  $x$  / 1}{ a , b , c };
Par défaut : : deltacl=0.5 cm

```

Épaisseur des lignes du tableau			
$x$	a	b	c
$\backslash\mathrm{tkzTabInit}[\mathrm{dlw}=2\mathrm{pt}]\{x / 1\}\{a, b, c\};$ Par défaut : : lw=0,4 pt			

Absence de cadre			
$x$	a	b	c
$\backslash\mathrm{tkzTabInit}[\mathrm{nocadre}]\{x / 1\}\{a, b, c\};$ Par défaut : : nocadre=false			

Mise en couleur			
\tkzTabInit [color,colorT = yellow]{1°ligne/1 , 2°ligne/1}{ a , b }			
1°ligne	a	b	
2°ligne			
[color,colorT = yellow]		[color,colorC = cyan]	
1°ligne	a	b	
2°ligne			
[color,colorL = green]		[color,colorV = magenta]	
Par défaut : : color = false		colorT=colorC=colorL=colorV =white	

### 25.2 Création d’une ligne de signes

$x$	a	b	c
$f(x)$	2	4	
$\backslash\mathrm{tkzTabLine}\{\mathrm{t}, 2,\mathrm{t},4,\mathrm{t}\}$			
$x$	a	b	c
$f(x)$	2	4	
$\backslash\mathrm{tkzTabLine}\{\mathrm{d}, 2,\mathrm{d},4,\mathrm{d}\}$			
$x$	a	b	c
$f(x)$	0	2	0
$\backslash\mathrm{tkzTabLine}\{\mathrm{z}, 2,\mathrm{z},4,\mathrm{z}\}$			
$x$	a	b	c
$f(x)$	1	3	4
$\backslash\mathrm{tkzTabLine}\{1,\mathrm{h},3,4,5\}$			

Exemple					
$x$	$-\infty$	$-4$	$4$	$10$	$+\infty$
$f(x)$	$\vdots$	$+$		$-$	$\vdots$
			$0$		$+$

```

\begin{tikzpicture}
\tkzTabInit[espc1=1.5]{ $x$  / 1 ,  $f(x)$  / 1 } {  $-\infty$  ,  $-4$  ,  $4$  ,  $10$  ,  $+\infty$  }
\tkzTabLine{ t,+ , d , h , d,-,z,+ }
\end{tikzpicture}

```

### 25.3 Création d'une ligne de variations

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$\backslash\text{tkzTabVar}\{+/1, -/2\}$	$\backslash\text{tkzTabVar}\{-/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$\backslash\text{tkzTabVar}\{-/1, -/2\}$	$\backslash\text{tkzTabVar}\{+/1, +/2\}$																

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$\backslash\text{tkzTabVar}\{+C/1, -/2\}$	$\backslash\text{tkzTabVar}\{-C/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$\backslash\text{tkzTabVar}\{-/1, -C/2\}$	$\backslash\text{tkzTabVar}\{+/1, +C/2\}$																

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2
$x$	a	b	c														
$f(x)$	1		2														
$x$	a	b	c														
$f(x)$	1		2														
$\backslash\text{tkzTabVar}\{+H/1, -/2\}$	$\backslash\text{tkzTabVar}\{-H/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\rightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\rightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\rightarrow$	2														
$\backslash\text{tkzTabVar}\{-/1, -H/2\}$	$\backslash\text{tkzTabVar}\{+/1, +H/2\}$																

$x$	a	b	c
$f(x)$	1	$\longrightarrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

$\backslash\text{tkzTabVar}\{+\textcolor{red}{D}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{D}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

$\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{D}/2\}$	$\backslash\text{tkzTabVar}\{+/1,+\textcolor{red}{D}/2\}$		
$x$	a	b	c
$f(x)$		1	$\searrow$

$x$	a	b	c
$f(x)$		1	$\nearrow$

$\backslash\text{tkzTabVar}\{\textcolor{red}{D}+/1,-/2\}$	$\backslash\text{tkzTabVar}\{\textcolor{red}{D}-/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\longrightarrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

$\backslash\text{tkzTabVar}\{-/1,\textcolor{red}{D}-/2\}$	$\backslash\text{tkzTabVar}\{+/1,\textcolor{red}{D}+/2\}$		
$x$	a	b	c
$f(x)$	1		2

$x$	a	b	c
$f(x)$	1		2

$\backslash\text{tkzTabVar}\{+\textcolor{red}{DH}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{DH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

$\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{DH}/2\}$	$\backslash\text{tkzTabVar}\{+\textcolor{red}{DH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1		2

$x$	a	b	c
$f(x)$	1		2

$\backslash\text{tkzTabVar}\{+\textcolor{red}{CH}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{CH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

| $\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{CH}/2\}$ | $\backslash\text{tkzTabVar}\{+/1,+\textcolor{red}{CH}/2\}$ |

$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +D-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -D+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -D-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +D+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +CD-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -CD+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -CD-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +CD+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +DC-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -DC+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -DC-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +DC+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +V-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -V+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -V-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +V+/2 , -/3 }			

Mise en évidence d'une valeur			
$x$	a	b	c
$f(x)$	1	2	3

`\tkzTabVar{+/1 , -V-/\colorbox{yellow}{2} , +/3}`

Variation sur plusieurs colonnes			
$x$	a	b	c
$f(x)$	1	→ 3	

`\tkzTabVar{-/1 , R/ , +/3}`

Valeurs intermédiaires

$x$	$x$
$a \quad A \quad b \quad c$	$a \quad b \quad A \quad c$
$f(x)$	$f(x)$
$1 \xrightarrow{x} 3$	$1 \xrightarrow{x} 3$

$\backslash\mathrm{tkzTabVal}\{1\}\{3\}\{0.25\}\{A\}\{x\}$

$\backslash\mathrm{tkzTabVal}\{1\}\{3\}\{0.75\}\{A\}\{x\}$

$x$	a	A	b	c
		⋮		
$f(x)$	1	x	→ 3	

`\tkzTabVal[draw]{1}{3}{0.25}{A}{x}`

Ajout d'images									
$x$	a	b	c	d	$x$	a	b	c	d
$f(x)$	1	→ 3			$f(x)$	1	→ 3		


`\tkzTabIma{1}{4}{2}{x}`      `\tkzTabIma{1}{4}{3}{x}`




## 26 Les répétitions

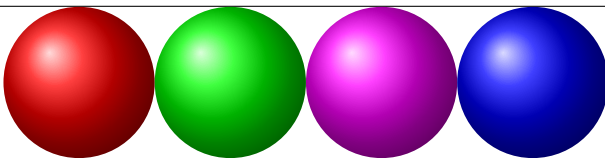
Utilisation du module “pgffor”chargé automatiquement avec TikZ

### 26.1 Répétition à 1 variable


<code>\tikz \foreach \x in {1,...,10} \fill[blue](\x,0) circle (0.4cm);</code>
Variable <code>\x</code> : position en X

### 26.2 Répétition à 2 variables

Liste de variables numériques

<code>\tikz \foreach \pos/\y in {1/10,2/20,3/30,4/40,5/50,6/60,7/70,8/80,9/90,10/100} \fill[color=blue!\y](\pos,0) circle (0.5cm);</code>
Variable <code>\pos</code> : position en X      Variable <code>\y</code> : couleur

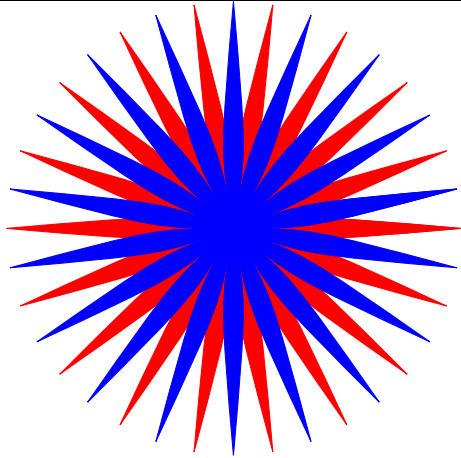
Liste de variables mixtes

<code>\tikz \foreach \x/\col in 1/red,3/green,5/magenta,7/blue \shade[ball color=\col](\x,0) circle (1);</code>
Variable <code>\x</code> : position en X      Variable <code>\col</code> : couleur

Liste de variables avec un pas								
1,3	2,3	3,3	4,3		7,3	8,3	9,3	10,3
1,2	2,2	3,2	4,2		7,2	8,2	9,2	10,2
1,1	2,1	3,1	4,1		7,1	8,1	9,1	10,1

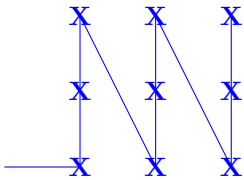
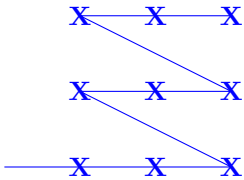
```
\begin{tikzpicture}
\foreach \x in{1,2,...,4,7,8,...,10}
\foreach \y in {1,...,3}
{ \draw (\x,\y) ++(-.5,-.5) rectangle ++(.5,.5); \draw (\x,\y)
node\x,\y; }
\end{tikzpicture}
```

Variable \x : position en X	Variable \y : position en Y
-----------------------------	-----------------------------

Exemples de liste	
1, 2, 3, 4, 5, 6,	<code>\foreach \x in {1,...,6} {\x, }</code>
1, 3, 5, 7, 9, 11,	<code>\foreach \x in {1,3,...,11} {\x, }</code>
Z, X, V, T, R, P, N,	<code>\foreach \x in {Z,X,...,M} {\x, }</code>
$2^1, 2^2, 2^3, 2^4, 2^5, 2^6, 2^7,$	<code>\foreach \x in {2^1,2^2,...,2^7} {\x, }</code>
0cm, 0.5cm, 1cm, 1.5cm, 2cm, 2.5cm, 3cm,	<code>\foreach \x in {0cm,0.5cm,...cm,3cm} {\x, }</code>
$A_1, B_1, C_1, D_1, E_1, F_1, G_1, H_1,$	<code>\foreach \x in {A_1,..._1,H_1} {\x, }</code>

Variables numériques avec opération

<pre> \begin{tikzpicture} \foreach \x in 0,20,...,360{ \filldraw[red] (0,0) .. controls (\x+10:1) .. (\x:1) .. controls (\x-10:1) .. (0,0);} \foreach \x in 10,30,...,370{ \filldraw[blue] (0,0) .. controls (\x+10:3) .. (\x:3) .. controls (\x-10:3) .. (0,0);} \end{tikzpicture} </pre>
Variable $\backslash \textcolor{red}{x}$ : angle

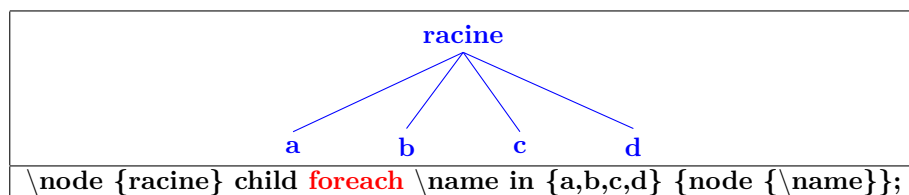
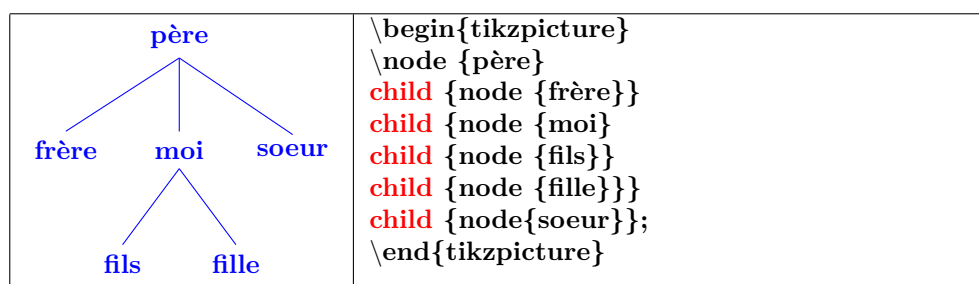
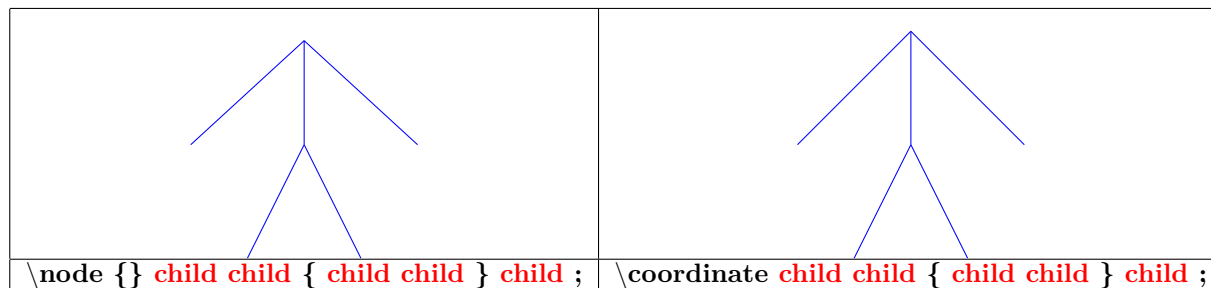
### 26.3 Répétition à 2 variables - boucles imbriquées

Ordre des boucles imbriquées	
	
<pre> \begin{tikzpicture} \draw (0,0) \foreach \x in {1,2,3} \foreach \y in {0,1,2} {- (\x,\y) node{X}}; \end{tikzpicture} </pre>	<pre> \begin{tikzpicture} \draw (0,0) \foreach \y in {0,1,2} \foreach \x in {1,2,3} {- (\x,\y) node{X}}; \end{tikzpicture} </pre>

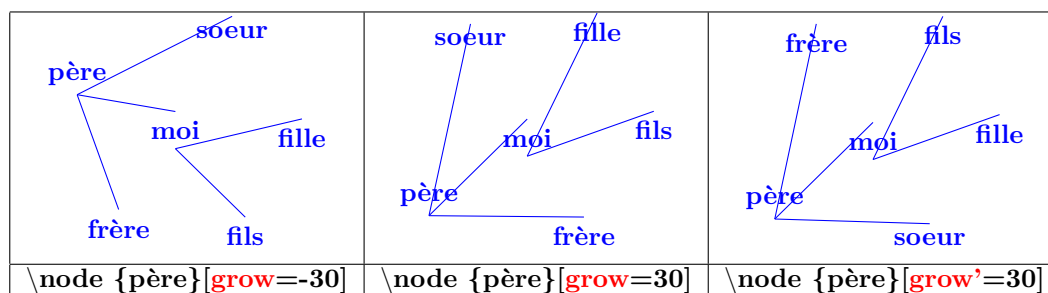
## 27 Les diagrammes arborescents

PGFmanual section : 21

### 27.1 Structure



### 27.2 Orientation



<code>\node {père}[grow=up]</code>	<code>\node {père}[grow=left]</code>	<code>\node {père}[grow=right]</code>
<code>\node {père}[grow=north]</code>	<code>\node {père}[grow=east]</code>	<code>\node {père}[grow=north east]</code>

	<pre> \node {père} child[grow=right,red] {node {frère}} child {node {moi}} child {node {fils}} child {node {filles}} child[grow=north west,red] {node{soeur}}; </pre>
--	---

### 27.3 Distance

### 27.4 Distance père fils

<code>\node {père}[level distance=3cm,red]</code>	<pre> child[level distance=3cm,red] {node {frère}} child[level distance=.5cm,red] {node {filles}} </pre>
Par défaut : : level distance=15 mm	

<code>\node {père}[level 1/.style={level distance=1cm}]</code>	<code>\node {père}[level 2/.style={level distance=.5cm}]</code>

27.5 Distance père fils

<code>\node {père}[sibling distance=1cm,red]</code>	<code>\node {père}[sibling distance=3cm,red]</code>
Par défaut : : sibling distance=15 mm	

Problème	solution
<code>[sibling distance=2cm]</code>	<code>[level 1/.style=sibling distance=2cm, level 2/.style=sibling distance=1cm]</code>

## 27.6 Personnalisation des noeuds

	<pre>\node[starburst<sup>1</sup>,draw] {père}[grow=right] child {node[diamond,draw] frère} child {node[diamond,draw] moi} child {node[ellipse,draw] fils} child {node[ellipse,draw] fille}} child {node[diamond,draw] soeur};</pre>
	<pre>\node[rectangle,double,draw,text width=1cm,text centered] {père}[grow=right,level distance=2cm] child {node[red,ultra thick,draw,rotate=45] {frère}} child {node[blue,dashed, draw] {moi}} child {node[ellipse,draw] {fils}} child {node [ellipse,fill] {fille}}} child {node [magenta,pattern=dots,draw] {soeur}}};</pre>

### 27.6.1 Nom des noeuds

The diagram illustrates a tree structure with nodes labeled as follows:

- a**: The root node at the top.
- a-1** and **a-2**: Children of **a**.
- a-2-1** and **a-2-2**: Children of **a-2**.
- a-2-1-2**: A child of **a-2-1**.

The edge connecting **a-1** and **a-2** is highlighted in red. The corresponding TeX code for generating this diagram is shown on the right:

```
\node (a) {a}
child
child {
child {child child}
child {child }
};
\node at (a-1) {a-1};
\node at (a-2) {a-2};
\node at (a-2-2) {a-2-2};
\node at (a-2-1) {a-2-1};
\node at (a-2-1-2) {a-2-1-2};

\draw[red,ultra thick] (a-1) -- (a-2);
```

<sup>1</sup>autres types de nœuds voir section 17

	<pre> \begin{tikzpicture} \node (a) {a}   child   child   child coordinate (b) child child   child ; \node at (a-1) {a-1}; \node at (a-2) {a-2}; \node at (b) {b}; \node at (a-2-2) {a-2-2}; \node at (b-1) {b-1}; \node at (a-2-1-2) {a-2-1-2};  \draw[red,ultra thick] (a-1) -- (b-1); \end{tikzpicture} </pre>
--	---

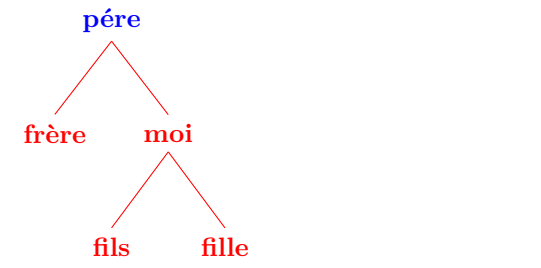
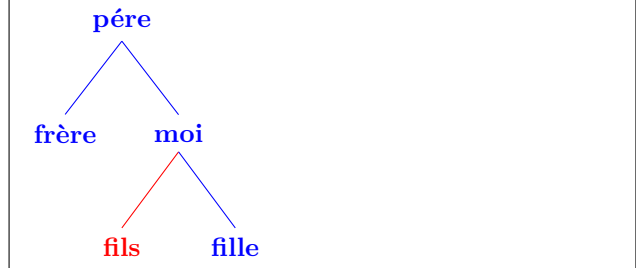
	<pre> \begin{tikzpicture} \node (a) {père}   child {node (b) {frère}}   child {node (c) {moi}}   child {node (d) {fils}}   child {node (e) {filles}}   child {node (f) {soeur}};  \draw[red,ultra thick] (b) -- (d); \end{tikzpicture} </pre>
--	---

### 27.6.2 Omission d'un noeud

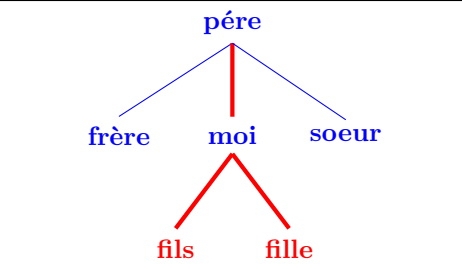
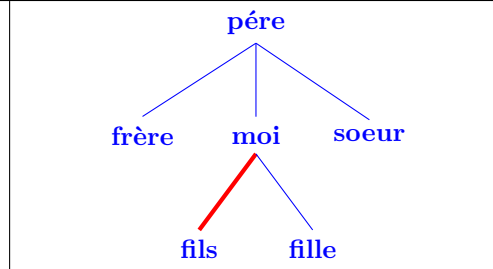
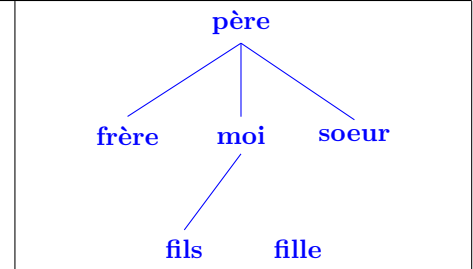
	<pre> \begin{tikzpicture} \node (0) {0}   child[missing] {node {4}}   child {node {1}}   child {node {2}}   child {node {3}}   child {node {5}}   child {node {6}}; \end{tikzpicture} </pre>
--	--

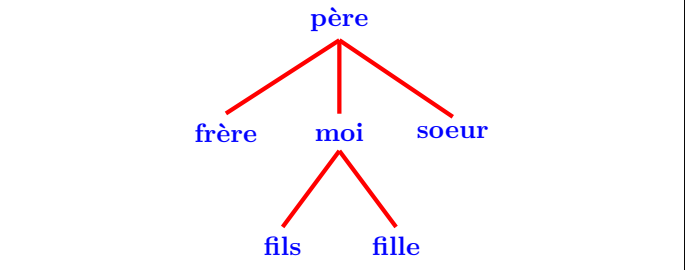
### 27.6.3 Modification du point d'accrochage

<pre> \begin{tikzpicture} \node {père} [child anchor=east,red]   child {node {frère}}   child {node {moi}}   child {node {fils}}   child {node {fils}}; \end{tikzpicture} </pre>	<pre> \begin{tikzpicture} \node {père}   child {node {frère}}   child {node {moi}}   child [child anchor=west,red] {node {fils}}   child {node {fils}}; \end{tikzpicture} </pre>

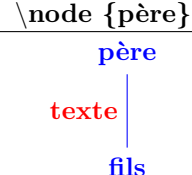
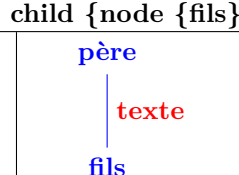
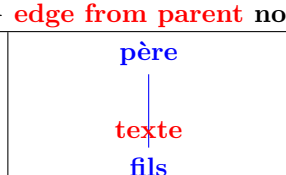
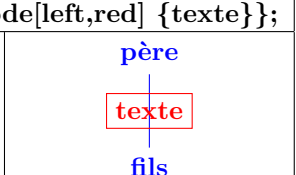
	
<pre>\node {père} [parent anchor=east,red] child {node {frère}} child { node {moi}} child {node {fils}} child {node {fils}} };</pre>	<pre>\node {père} child {node {frère}} child { node {moi}} child [parent anchor=west,red] {node {fils}} child {node {fils}} };</pre>

#### 27.6.4 Liaison

		
<pre>child {node {moi}} edge from parent[red,ultra thick]</pre>	<pre>child {node {fils}} edge from parent[red,ultra thick] }</pre>	<pre>child { node {fille}} edge from parent[draw=none] }</pre>

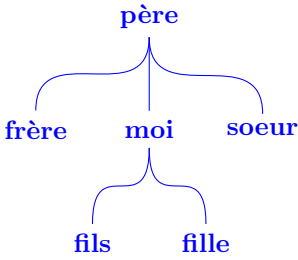
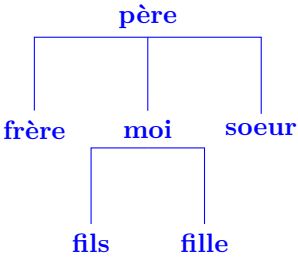
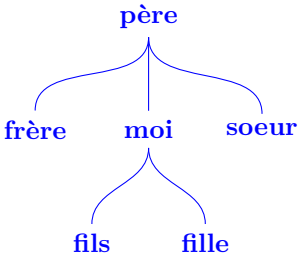

<pre>[edge from parent/.style={draw,red,ultra thick}] \node {père}</pre>

#### 27.6.5 Étiquettes sur liaisons

\node {père} child {node {fils} edge from parent node[left,red] {texte}};			
			
node[left,red]	node[right,red]	node[near end,red]	node[draw,red]



27.6.6 Personalisation des liaisons

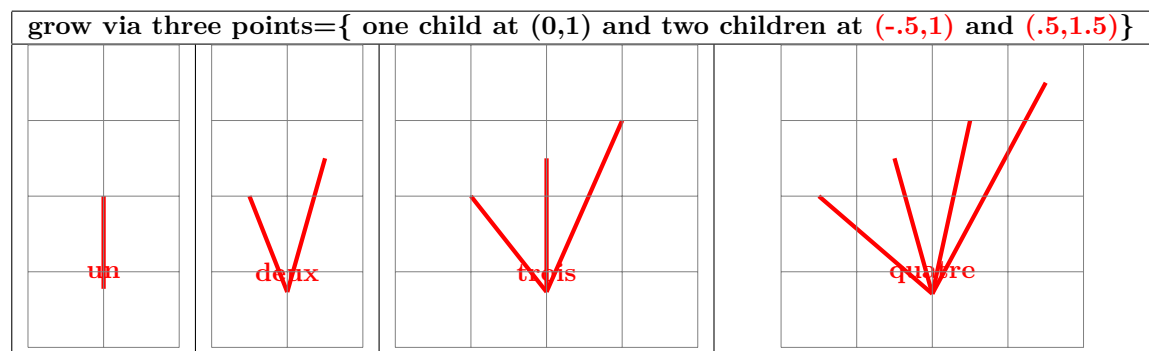
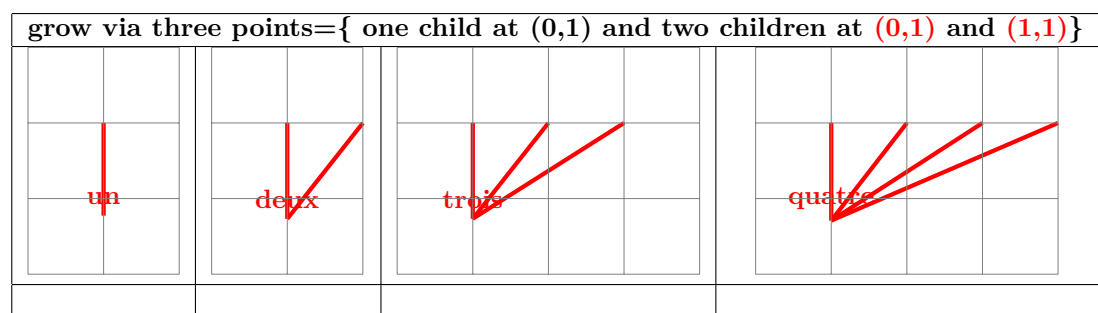
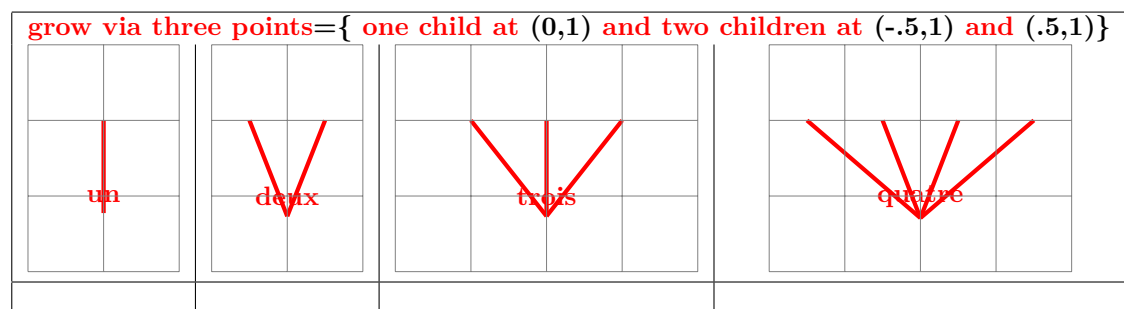
[ edge from parent path= {(\tikzparentnode.south) .. controls +(0,-1) and +(0,1) .. (\tikzchildnode.north)} ]		
		
.. controls +(0,-1) and +(0,1) ..	-	to[in=90,out=-90]
voir liaison de noeuds section 7.2		

## 27.7 Options supplémentaires avec « library trees »

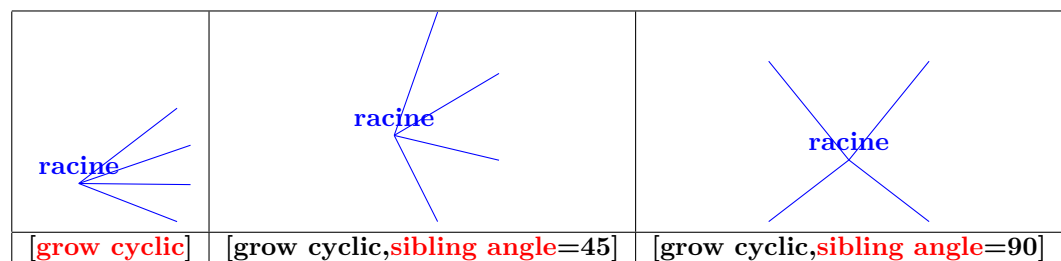
Charger l'extension: `\usetikzlibrary{trees}`

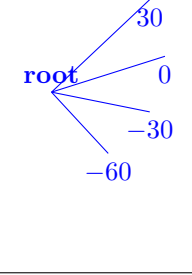
PGFmanual section : 72

### 27.7.1 Positions d'un fils et de deux fils

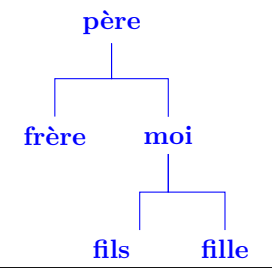


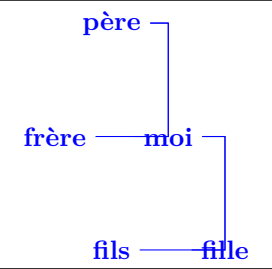
### 27.7.2 Liaison angulaire

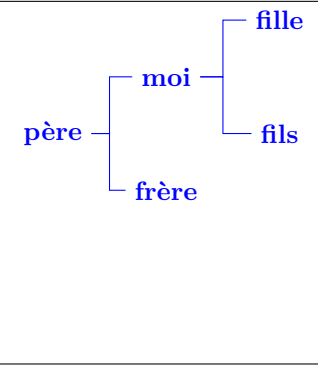


	<pre> \mode {racine} [clockwise from=30,sibling angle=30]  child {node {\$30\$} } child {node {\$0\$} } child {node {\$-30\$} } child {node {\$-60\$} };</pre>
---	--

### 27.7.3 Liaisons en fourchette

	<pre> \mode {père} [edge from parent fork down]  child {node {frère}} child {node {moi}} child [child anchor=north east] {node {fils}} child {node {fille}} };</pre>
---	--

	<pre> \mode {père} [edge from parent fork right]  child {node {frère}} child {node {moi}} child {node {fils}} child {node {fille}} };</pre>
--	---

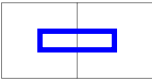
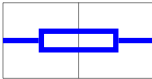
	<pre> \mode {père} [edge from parent fork right,grow=right]  child {node {frère}} child {node {moi}} child {node {fils}} child {node {fille}} };</pre>
---	--


















28 Les schemas électriques










Charger l'extension: `\usepackage{circuits.ee.IEC}`

28.1 Symboles

PGFmanual section : 47-4

sur un noeud	sur un chemin
	
<code>\node [circuit ee IEC] at (1,0.5) to [resistor] {} ;</code>	<code>\draw [circuit ee IEC](0,0.5) to [resistor] (2,.5) ;</code>

Composants de base			
<code>\draw [circuit ee IEC] (0,.5) to [resistor] (2,.5) ;</code>			
PGFmanual section : 47-4-3			
			
[resistor]	[inductor]	[capacitor]	[battery]
			
[bulb]	[current source]	[voltage source]	[ground]
PGFmanual section : 47-4-4			
			
[diode]	[Zener diode]	[Schottky diode]	[tunnel diode]
			
[backward diode]	[breakdown diode]		
PGFmanual section : 47-4-5			
			
[contact]	[make contact]	[break contact]	

Autre apparence		
<code>\draw [circuit ee IEC,set resistor graphic=var resistor IEC graphic ] (0,0.5) to [resistor] (2,0.5) ;</code>		
		
resistor	inductor	diode
		
Zener diode	Schottky diode	tunnel diode
		
backward diode	breakdown diode	make contact

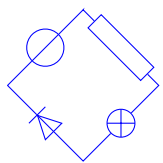
Taille des symboles				
PGFmanual section : 47-2-1				
\draw [circuit ee IEC] (0,0.5) to [diode,large circuit symbols] (2,0.5) ;				
huge circuit symbols (10pt)	large circuit symbols (8pt)	medium circuit symbols (7pt)	small circuit symbols (6pt)	tiny circuit symbols (5pt)

\draw [circuit ee IEC,circuit symbol unit=14pt] (0,0.5) to [diode] (2,0.5) ;		
circuit symbol unit=14pt	circuit symbol size=width 3 height 1	circuit symbol size=width 1 height 5 ne fonctionne pas !



Création de nouveaux symboles			
PGFmanual section : 47-2-2			
	\begin{tikzpicture} [circuit declare symbol=xxx, set xxx graphic={draw,shape=rectangle,minimum size=5mm}] \node [xxx] at (.5,.5) ; \draw[circuit ee IEC] (1,.5) to [xxx] (3,.5) ; \end{tikzpicture}		
shape=circle	shape=dart	shape=star	shape=forbidden sign
voir les “different shape libraries”see the different shape libraries			
















Placement des symboles sur un chemin	
\draw [circuit ee IEC] (0,0.5) to [contact={at start},make contact={very near start},voltage source={near start},resistor, bulb={near end}, bulb={very near end},contact={at end}] (12,0.5) ;	
\draw [circuit ee IEC] (0,0.5) to [contact={pos=0},make contact={pos=0.2},voltage source={pos=0.3},resistor={pos=0.5}, bulb={pos=0.75},contact={pos=1}] (12,0.5) ;	

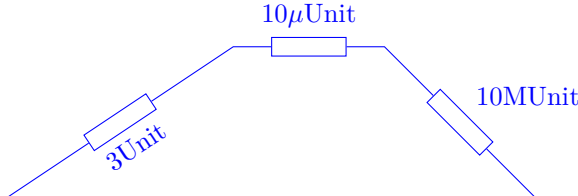
Orientation des symboles			
PGFmanual section : 47-2-3			
\node [circuit ee IEC] at (1,.5) [diode,point up] {} ;			
[diode,point up]	[diode,point down]	[diode,point left]	[diode,point right]



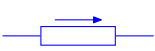









Orientation automatique	
	<pre>\draw [circuit ee IEC] (0,0) to [voltage source] (1,1) to [resistor] (2,0) to [bulb] (1,-1) to [diode] (0,0) ;</pre>

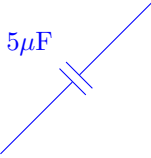
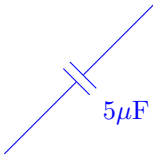
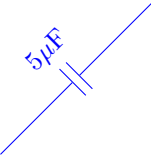
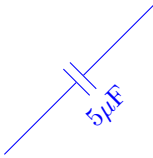
## 28.2 Annotations

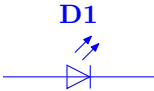
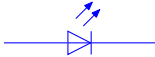
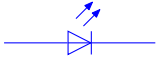
Sens du courant	
PGFmanual section : 47-4-2	
\draw [circuit ee IEC] (0,0.5) to [current direction] (2,0.5) ;	
	
[current direction]	[current direction']

Unités disponibles				
PGFmanual section : 47-4-6				
\node [draw,circuit ee IEC] at(1,,5) [ampere=5] {}				
5A 	5V 	5 	5S 	5H 
[ampere=5]	[volt=5]	[ohm=5]	ne fonctionne pas !	[siemens=5]
5F 	5C 	5VA 	5W 	5Hz 
[farad=5]	[coulomb=5]	[voltampere=5]	[watt=5]	[hertz=5]
5kA 	5mA 	5μA 	5kW 	5MW 
[ampere=5k]	[ampere=5m]	[ampere=5\mu]	[watt=5k]	[watt=5M]



créer sa propre unité	
PGFmanual section : 47-2-4	
<pre>\tikz[circuit ee IEC,circuit declare unit={xxx}{ Unit}] \draw (0,0) to[resistor={xxx' sloped=3}] (3,2) to [resistor={xxx= 10\mu}] (5,2) to [resistor={xxx= 10M}]</pre>	
	









Annotations			
<a href="#">PGFmanual section : 47-4-7</a>			
\draw [circuit ee IEC] (0,0.5) to [resistor=light emitting] (2,0.5) ;			
			
[resistor=light emitting]	[resistor=light dependent]	[resistor=direction info]	[resistor=adjustable]
			
[diode=light emitting]	[diode=light dependent]	[diode=direction info]	[diode=adjustable]
			
[diode=light emitting']	[diode=light dependent']	[diode=direction info']	[diode=adjustable']

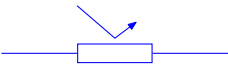
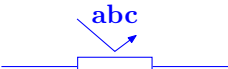

Position des unités	
<a href="#">PGFmanual section : 47-2-4</a>	
\draw [circuit ee IEC] (0,0) to [capacitor={farad=5\mu}] (2,2) ;	
	
[capacitor={farad=5\mu}]	[capacitor={farad'=5\mu}]
	
[capacitor={farad sloped=5\mu}]	[capacitor={farad' sloped=5\mu}]

Informations		
<a href="#">PGFmanual section : 47-2-4</a>		
\draw [circuit ee IEC] (0,0.5) to [diode={light emitting={info=D1}}] (2,0.5) ;		
		
D1	D2	D3
[diode={light emitting={info=D1}} ]	[diode={light emitting={info'=D2}} ]	[diode={light emitting,info'




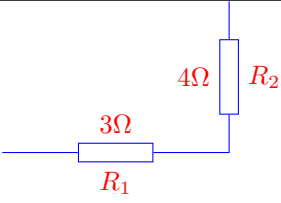
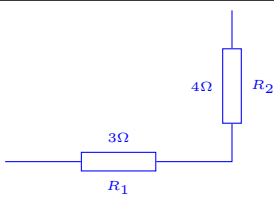
sur un noeud	sur un chemin
	
3Ω R1	3Ω R1
[resistor,info=\$3\Omega\$,info'=R1]	[resistor={info=\$3\Omega\$,info'=R1}]

	
<code>[resistor,point up,info=<b>center</b>:<math>\\$3\backslash\Omega</math>]</code>	<code>[resistor,point up,info=<b>center</b>:<math>\\$3\backslash\Omega</math>]</code>

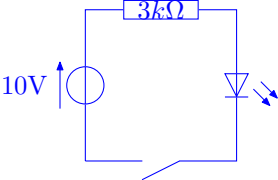
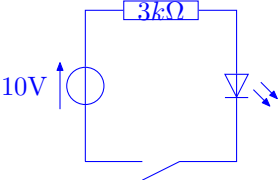
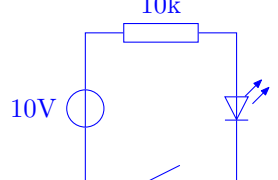
<code>\node [voltage source,<b>direction info</b>=\{volt=10\}] \{ }</code>		<code>\node [voltage source,<b>direction info'</b>=\{volt=10\}] \{ }</code>	
			
<code>\{volt=10\}</code> ou <code>\{-&gt;,volt=10\}</code>	<code>\{volt'=10\}</code> ou <code>\{-&gt;,volt'=10\}</code>	<code>\{volt=10\}</code> ou <code>\{-&gt;,volt=10\}</code>	<code>\{volt'=10\}</code> ou <code>\{-&gt;,volt'=10\}</code>
			
<code>\{&lt;-,volt=10\}</code>	<code>\{&lt;-,volt=10\}</code>	<code>\{&lt;-,volt=10\}</code>	<code>\{&lt;-,volt'=10\}</code>

Créer sa propre annotation <a href="#">PGFmanual section : 47-2-5</a>	
	<code>\tikzset{circuit <b>declare annotation</b>=\{XXX\}{9pt}</code> <code>\{ (-0.5cm,0.5cm) edge[to path=\{- -(0pt,2pt) - - (8pt,8pt)\}] () \}</code> <code>\tikz[blue,circuit ee IEC] \draw (0,0) to [resistor=<b>XXX</b>] (3,0);</code>
	<code>\tikzset{circuit declare annotation=\{xxx\}{<b>9pt</b>}}</code> <code>\{ (-0.5cm,0.5cm) edge[to path=\{- -(0pt,2pt) - - (8pt,8pt)\}] () \}</code> <code>\tikz[blue,circuit ee IEC] \draw (0,0) to [resistor=\{xxx=<b>{info=abc}</b>\}] (3,0);</code>
	<code>\tikzset{circuit declare annotation=\{xxx\}{<b>1cm</b>}}</code> <code>\{ (-0.5,0.5) edge[to path=\{- -(0pt,2pt) - - (8pt,8pt)\}] () \}</code> <code>\tikz[blue,circuit ee IEC] \draw (0,0) to [resistor=\{xxx=<b>{info=abc}</b>\}] (3,0);</code>



<p>Style des symboles</p> <p><a href="#">PGFmanual section : 47-2-6</a></p>	
<pre>\draw[circuit symbol lines/.style={draw,red,very thick}] (0,0) to [capacitor={near start},resistor, make contact={near end}] (5,0);</pre>	
	
<pre>\draw[circuit symbol wires/.style={draw,red,very thick}] (0,0) to [capacitor={near start},resistor, make contact={near end}] (5,0);</pre>	
	
<pre>\draw[circuit symbol open/.style={thick,draw,red,fill=yellow}] (0,0) to [capacitor={near start},resistor, make contact={near end}] (5,0);</pre>	
	
<pre>\tikz[blue,circuit ee IEC, every info/.style=red] \draw (0,0) to[resistor={info={3\Omega},info'={R_1}}] (3,0) to[resistor={info={4\Omega},info'={R_2}}] (3,2);</pre>	
	
<code>every info/.style=red</code>	<code>every info/.style={font=\tiny}</code>

### 28.3 Exemple

3 méthodes pour le même schéma	
	<pre> \begin{tikzpicture}[blue,circuit ee IEC] \draw (0,0) to [voltage source={direction info={-&gt;,volt=10}}] (0,2) to [resistor={info=center:\$3\text{ k}\Omega\$}] (2,2) to [diode=light emitting] ( 2,0) to [make contact] (0,0); \end{tikzpicture} </pre>
	<pre> \begin{tikzpicture}[blue,circuit ee IEC] \draw (0,0) to [voltage source={direction info={-&gt;,volt=10}}] ++(up:2) to [resistor={info=center:\$3\text{ k}\Omega\$}] ++(right:2) to [diode=light emitting] ++(down:2) to [make contact] ++(left:2) ; \end{tikzpicture} </pre>
	<pre> \begin{tikzpicture}[blue,circuit ee IEC] \node (A) at (0,1) [voltage source,point up,volt=10]{}; \node (B) at (1,2) [resistor,ohm=10k] {}; \node (C) at (2,1) [diode=light emitting,point down] {} ; \node (D) at ( 1,0) [make contact] {}; \draw (A)  - (B) -  (C)  - (D) -  (A); \end{tikzpicture} </pre>

j

## 29 Les circuits logiques

International Electrotechnical Commission :

























Charger l’extension: `\usepackage{circuits.logic.IEC}`




American logic gates :










Charger l’extension: `\usepackage{circuits.logic.US}`



logic symbols used in A. Croft, R. Davidson, and M. Hargreaves (1992), Engineering Mathematics, Addison-Wesley, 82–95 :

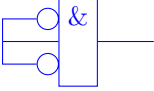
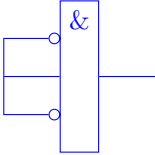
Charger l’extension: `\usepackage{circuits.logic.CDH}`




Composants de base		
<code>\node [circuit logic IEC] at (1,5) [and gate] {A} ;</code> <div style="border: 1px solid black; padding: 2px; display: inline-block;">PGFmanual section : 47-3-2</div>		
		
[circuit logic IEC] and gate	[circuit logic US] and gate	[circuit logic CDH] and gate
		
[circuit logic IEC] nand gate	[circuit logic US] nand gate	[circuit logic CDH] nand gate
		
[circuit logic IEC] or gate	[circuit logic US] or gate	[circuit logic CDH] or gate
		
[circuit logic IEC] nor gate	[circuit logic US] nor gate	[circuit logic CDH] nor gate
		
[circuit logic IEC] xor gate	[circuit logic US] xor gate	[circuit logic CDH] xor gate
		
[circuit logic IEC] xnor gate	[circuit logic US] xnor gate	[circuit logic CDH] xnor gate
		
[circuit logic IEC] not gate	[circuit logic US] not gate	[circuit logic CDH] not gate
		
[circuit logic IEC] buffer gate	[circuit logic US] buffer gate	[circuit logic CDH] buffer gate




Avec etiquette		
<pre>\node [circuit logic IEC] at (1,.5) [and gate] {A} ;</pre>		
PGFmanual section : 47-3-1		
		
[circuit logic IEC]	[circuit logic US]	[circuit logic CDH]

Orientation		
PGFmanual section : 47-3-1		
<pre>\node [circuit logic IEC] at (1,.5) [and gate,point down] {A} ;</pre>		
		
[circuit logic IEC]	[circuit logic US]	[circuit logic CDH]
<pre>\node [circuit logic IEC] at (1,.5) [and gate,point up] {A} ;</pre>		
		
[circuit logic IEC]	[circuit logic US]	[circuit logic CDH]
<pre>\node [circuit logic IEC] at (1,.5) [and gate,point left] {A} ;</pre>		
		
[circuit logic IEC]	[circuit logic US]	[circuit logic CDH]

Entrées sortie	
PGFmanual section : 47-3-3	
	<pre>\node [and gate IEC, draw, logic gate inputs={inverted ,normal , inverted }] at (1,.5) (A) {}; \draw [red] (A.input 1) -  (0,0.5); \draw [green] (A.input 2) -  (0,0.5); \draw [cyan] (A.input 3) -  (0,0.5); \draw (A.output) -  (2,0.5);</pre>
	<pre>\node [and gate IEC, draw, logic gate inputs={ini}] at (1,.5) (A) {}; \draw [red] (A.input 1) -  (0,0.5); \draw [green] (A.input 2) -  (0,0.5); \draw [cyan] (A.input 3) -  (0,0.5); \draw (A.output) -  (2,0.5);</pre>

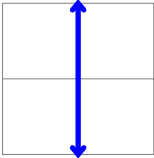
Paramètres des entrées	
<pre>\node [and gate IEC, draw, logic gate inputs=ini,logic gate inverted radius=4pt ] at (1,.5) (A) {};</pre>	
<div>PGFmanual section : 47-3-3</div>	
	
logic gate inverted radius=4pt	logic gate input sep=0.5cm

Paramètres des symboles		
<pre>\node [circuit logic IEC,and gate IEC symbol=AND ] at (1,.5) [and gate] {}</pre>		
<div>PGFmanual section : 47-3-5</div>		
		
and gate IEC symbol =AND	logic gate IEC symbol color =red	logic gate IEC symbol align ={bottom, right}

Paramètres des composants		
<pre>\node [circuit logic IEC,very thick ] at (1,.5) [and gate] {}</pre>		
<div>PGFmanual section : 47-3-5</div>		
		
very thick	fill=blue!10	fill=blue!10, logic gate IEC symbol color=black









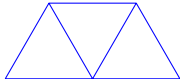


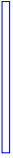





# 30 Optique

Charger l'extension: `\usepackage{optics}` [6]

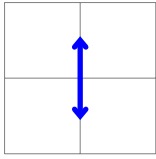
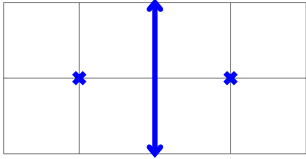
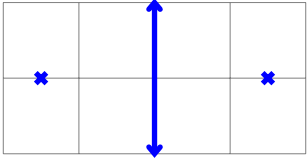
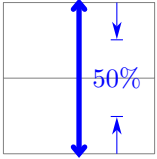
	<pre>\begin{tikzpicture}[blue,line width=2pt] \draw[help lines] (-1,-1) grid (1,1); \node[use optics,lens] (L) at (0,0) ; \end{tikzpicture}</pre>
---	---



## 30.1 Éléments optiques

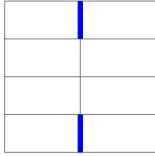
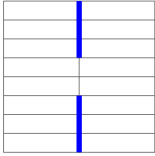
### 30.1.1 Éléments optiques disponibles

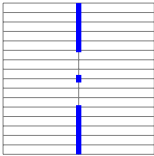
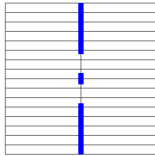
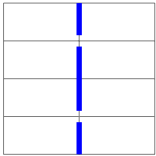
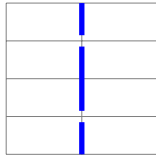
Éléments optiques				
\tikz[use optics,blue] \node[lens] (L) at (0,0) {};				
				
lens	slit	double slit	mirror	
				
convex mirror	concave mirror	polarizer	beam splitter	double amici prism
				
thin optics element	thick optics element	heat filter	screen	
				
diffraction grating	grid	semi-transparent mirror	diaphragm	

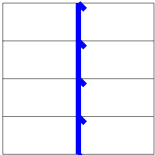
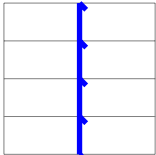
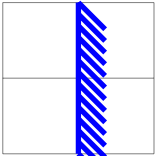
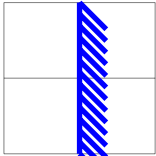
### 30.1.2 Paramètres

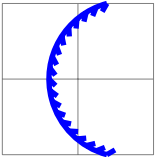
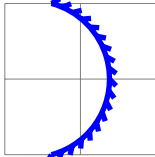
\node[lens,object height=1cm] (L) at (0,0) {};			
			
object height=1cm Par défaut : 2cm	draw focal points Par défaut : empty	focal length=1.5cm Par défaut : 1cm	focal height=0.5 Par défaut : 0.8 (80%)

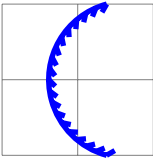
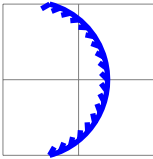
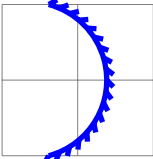
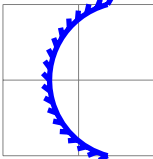
Lens type	
\node[lens,lens type=converging] (L) at (0,0) {};	
	
lens type=converging	lens type=diverging

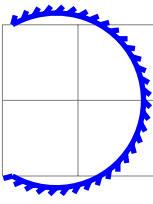
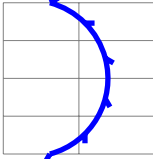
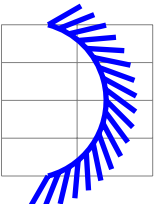
slit parameters	
\node[slit,slit height=0.5] (L) at (0,0) {};	
	
slit height=0.5	slit height=0.5cm
Par défaut : 0.075 (7.5% )	

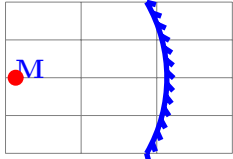
Double slit parameters			
\node[double slit,slit height=0.15] (L) at (0,0) {};			
			
slit height=0.15	slit height=0.25cm	slit separation=0.5	double slit, slit separation=1cm
Par défaut : 0.075 (7.5% x 2cm = 1.5 mm)		Par défaut : 0.2 (20% x 2cm = 4mm)	

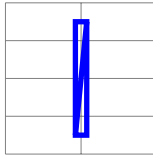
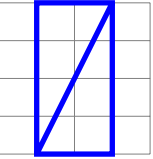
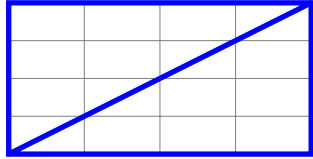
mirror parameters	
\node[mirror,mirror decoration separation=0.25] (L) at (0,0) {};	
	
mirror decoration separation=0.25	mirror decoration separation=0.5cm
Par défaut : 0.15cm	
	
mirror decoration amplitude=0.25	mirror decoration amplitude=1cm
Par défaut : 0.125cm	

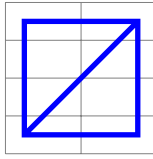
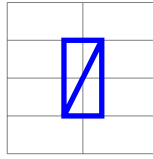
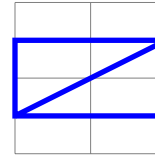
spherical mirror type	
\node[convex mirror](L) at (0,0) {};	
	
convex mirror	concave mirror
spherical mirror, spherical mirror type=convex	spherical mirror, spherical mirror type=concave

spherical mirror orientation	
\node[convex mirror, <b>spherical mirror orientation=ltr</b> ](L) at (0,0) {};	
	
convex mirror, <b>spherical mirror orientation=ltr</b>	convex mirror, <b>spherical mirror orientation=rtl</b>
	
concave mirror <b>spherical mirror orientation=ltr</b>	concave mirror, <b>spherical mirror orientation=rtl</b>

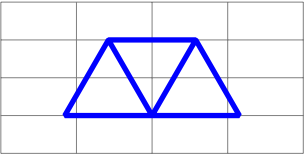
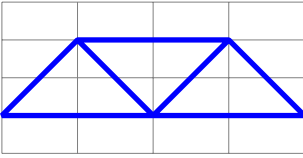
\node[spherical mirror, <b>spherical mirror angle=240</b> ](L) at (0,0) {};		
		
<b>spherical mirror angle=240</b> Par défaut : 150	<b>mirror decoration separation=0.25</b> Par défaut : 0.15cm	<b>mirror decoration amplitude=0.5cm</b> Par défaut : 0.125cm

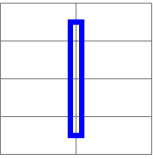
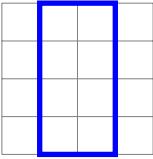
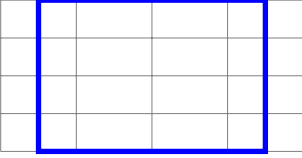
\node[spherical mirror, spherical mirror angle=from_radius(2cm)](L) at (0,0) {};


\node[polarizer, <b>object height=1.5cm</b> ](L) at (0,0) {};		
		
<b>object height=1.5cm</b> Par défaut : 2cm	<b>object aspect ratio=0.5</b> Par défaut : 0.2	<b>object aspect ratio=2</b>






\node[beam splitter, <b>object height=1.5cm</b> ](L) at (0,0) {};		
		
<b>object height=1.5cm</b>	<b>object aspect ratio=.5</b>	<b>object aspect ratio=2</b>












<code>\node[double amici prism,prism height=1cm](L) at (0,0) {};</code>	
	
<code>prism height=1cm</code>	<code>prism apex angle=90</code>
Par défaut : 1.5cm	Par défaut : 60

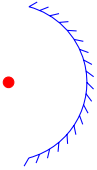






<code>\node[thick optics element,object height=1.5cm](L) at (0,0) {};</code>		
		
<code>object height=1.5cm</code>	<code>object aspect ratio=0.5</code>	<code>object aspect ratio=1.5</code>

### 30.1.3 Ancres

<code>\node[lens](L) at (0,0) {} ;</code> <code>\node[red,fill](L.lens north) circle (2pt) ;</code>				
				
<code>(L.lens north)</code>	<code>(L.lens south)</code>	<code>(L.east focus)</code>	<code>(L.west focus)</code>	<code>(L.center)</code>


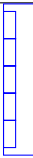



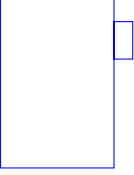


<code>\node[slit, slit height=0.5](L) at (0,0) {} ;</code> <code>\node[red,fill](L.slit north) circle (2pt) ;</code>		
		
<code>(L.slit north)</code>	<code>(L.slit south)</code>	<code>(L.slit center)</code>

<code>\node[double slit,slit height=0.2,slit separation=0.5](L) at (0,0) {} ;</code> <code>\node[red,fill](L.slit 1 north) circle (2pt) ;</code>					
					
<code>(L.slit 1 north)</code>	<code>(L.slit 1 south)</code>	<code>(L.slit 1 center)</code>	<code>(L.slit 2 north)</code>	<code>(L.slit 2 south)</code>	<code>(L.slit 2 center)</code>

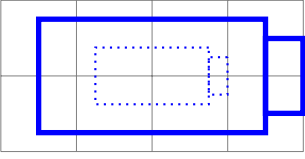
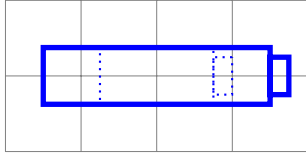
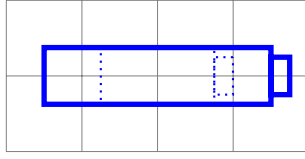
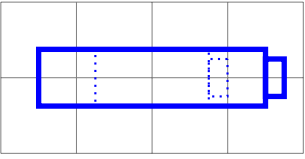
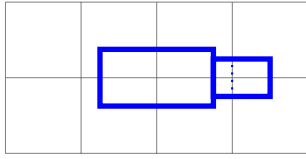
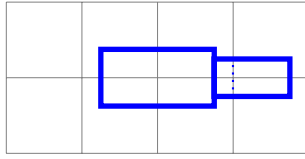
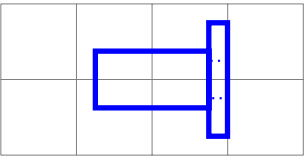
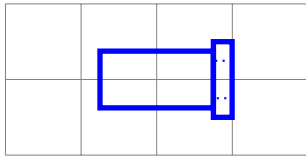
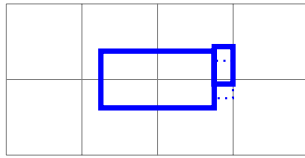
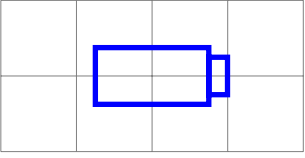
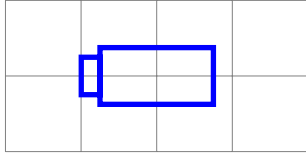
$\backslash$ node[spherical mirror] (L) at (0,0) {}; $\backslash$ node[red,fill] (L.mirror center) circle (2pt) ;						
						
L.mirror center	L.focus	L.arc start	L.arc center	L.arc end	L.45	L.-45

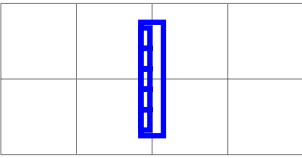
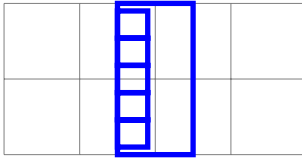
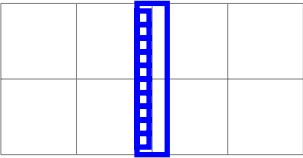
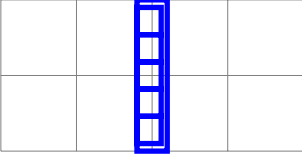
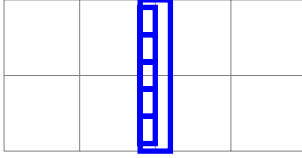
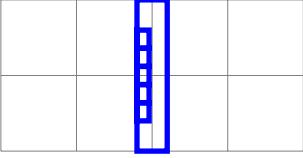
30.2 Lampes et capteurs

30.2.1 Disponibles

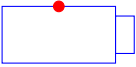
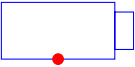
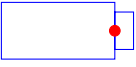
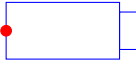



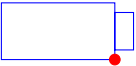
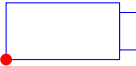









$\backslash$ tikz[use optics,scale=.5,blue] $\backslash$ node[generic optics io] (L) at (0,0) {};			
			
generic optics io	sensor line	generic sensor	generic lamp
			
halogen lamp	spectral lamp	laser	laser'

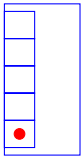
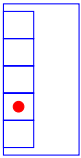
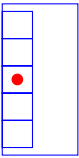
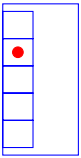
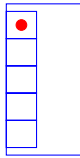
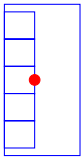
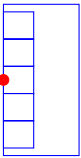
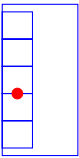
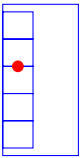
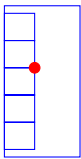
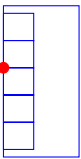
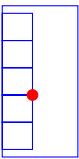
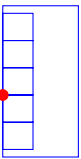
### 30.2.2 Paramètres

\node[ <b>generic optics io</b> , <b>io body height</b> =1.5cm](L) at (0,0) {};		
Paramètres applicables pour <b>generic sensor</b> , <b>generic lamp</b> , <b>halogen lamp</b> , <b>spectral lamp</b> , <b>laser</b>		
		
<b>io body height</b> =1.5cm Par défaut : 0.75cm	<b>io body aspect ratio</b> =4 Par défaut : 2	<b>io body width</b> =4
		
<b>io body width</b> =3cm	<b>io aperture width</b> =1	<b>io aperture width</b> =1cm
	Par défaut : 0.33	
		
<b>io aperture height</b> =2	<b>io aperture height</b> =1cm	<b>io aperture shift</b> =0.25
Par défaut : 0.66		Par défaut : 0
		
<b>io orientation</b> =ltr	<b>io orientation</b> =rtl	
Par défaut : ltr		

\node[sensor line, <b>sensor line height</b> =1.5cm](L) at (0,0) {};		
		
<b>sensor line height</b> =1.5cm Par défaut : 2cm	<b>sensor line aspect ratio</b> =0.5 Par défaut : 0.2	<b>sensor line pixel number</b> =10 Par défaut : 5
		
<b>sensor line pixel width</b> =0.8	<b>sensor line pixel width</b> =0.2cm	<b>sensor line inner ysep</b> =0.2
Par défaut : 0.4		Par défaut : 0.05

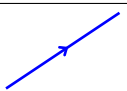
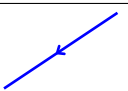
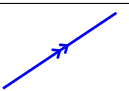
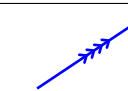

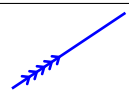
30.2.3 Points d’ancrages

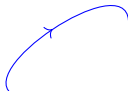
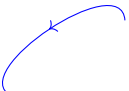

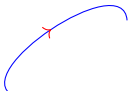
				
s.body north	s.body south	s.body east	s.body west	s.body cent
				
s.body north east	s.body north west	s.body south east	s.body south west	
				
s.aperture north	s.aperture south	s.aperture east	s.aperture west	s.aperture cen
				
s.aperture north east	s.aperture north west	s.aperture south east	s.aperture south west	


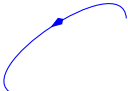

				
s.pixel 1 center	s.pixel 2 center	s.pixel 3 center	s.pixel 4 center	s.pixel 5 center
				
s.pixel 3 east	s.pixel 3 west	s.pixel 3 south	s.pixel 3 north	
				
s.pixel 3 north east	s.pixel 3 north west	s.pixel 3 south east	s.pixel 3 south west	

### 30.3 Outils

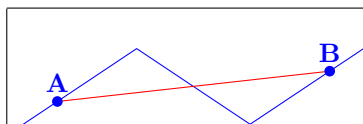
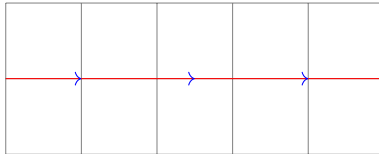
#### 30.3.1 Marquer des rayons

\draw [->-] (0,0) -- (1.5,1;					
					
[->-]	[-<-]	[-> >-]	[->n={n=4}]	[->n={n=5,at=0.25}]	[-> >-=at=0.25, ->-=at=0.75]

\draw [put arrow] (0,0) to[bend left=120] (2,0);			
			
[put arrow]	[put arrow={arrow'}]	[put arrow={at=0.2}]	[put arrow={style=red}]

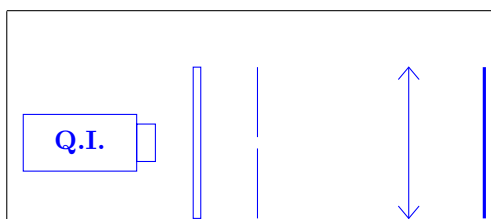
		
[red,put arrow={arrow=latex}]	[put arrow={arrow'=Kite}]	[put arrow={pos=.25}]
		Par défaut : pos=0.5

```
\draw[red, put arrow/every arrow/.style={blue}, put arrow={at=0.2},
put arrow={at=0.5}, put arrow={at=0.8}] (0,0) -- (5,0);
```



```
\begin{tikzpicture}[use optics,blue]
\draw[put coordinate=A at 0.1,put coordinate=B at 0.9]
(0,0) -- (1.5,1) -- (3, 0) -- (4.5,1);
\draw[red] (A) -- (B);
\fill(A) circle (2pt) node[above] {A} ;
\fill(B) circle (2pt) node[above] {B} ;
\end{tikzpicture}
```

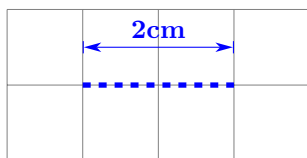
Point A à 10% , point B à 90%



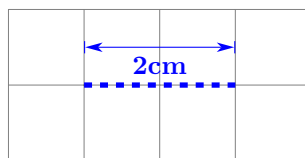
```
\begin{tikzpicture}[use optics]
\node[halogen lamp] (quartz iode) at (0,0) {Q.I.};
\node[heat filter,right=0.5cm of quartz iode.aperture east]
(AC) {};
\node[slit,right=0.75cm of AC] (fente) {};
\node[lens,right=2cm of fente] (L) {};
\node[screen,right=3cm of fente] (screen) {};
\end{tikzpicture}
```

### 30.3.2 Cotation

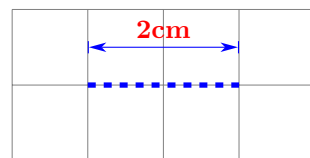
```
\draw (0,0) to[short dim arrow={label=2cm}] (2,0);
```



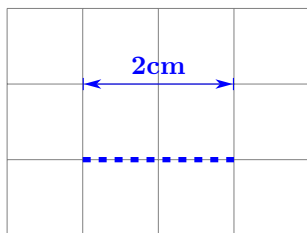
[**dim arrow**=**{label=2cm}**]



to[**dim arrow**=**{label'=2cm}**]

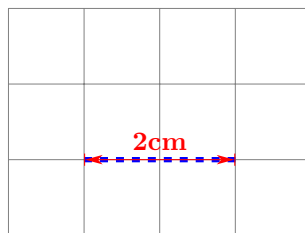


[**dim arrow**=**{label=2cm**  
**label style**/.append style=r

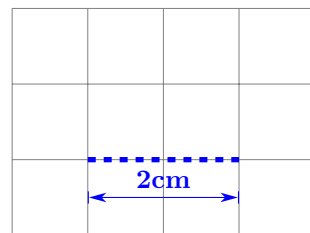


[**dim arrow**=**{label=2cm,raise=1cm}**]

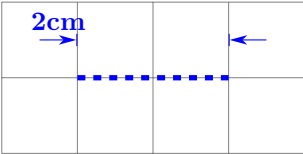
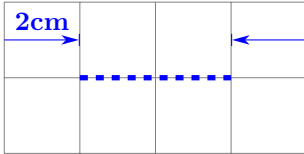
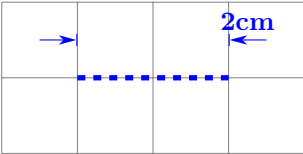
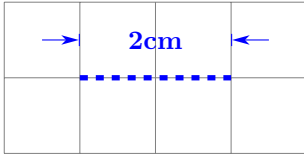
Par défaut : raise = 0.5cm



[**dim arrow**=**{label=2cm,no raise},red]**





[**dim arrow'**=**{label=2cm**

\draw (0,0) to[short dim arrow={label=2cm}] (2,0);	
	
[short dim arrow={label=2cm}]	[short dim arrow={label=2cm,arrow length=1cm}]
	Par défaut : arrow length= 5mm
	
[short dim arrow={label=2cm,label near end}]	[short dim arrow={label=2cm,label near middle}]
Par défaut : label near start	

## 31 Les animations

Charger l'extension: `\usepackage{animate}` [5]

### 31.1 Animation à partir de fichiers d'image

première image	seconde et dernière image
	
<code>\includegraphics{XXX1}</code>	<code>\includegraphics{XXX2}</code>

<code>\animategraphics:</code>	
<code>[ controls,</code>	<code>:boutons de contrôle</code>
<code>loop</code>	<code>:en boucle</code>
<code>autoplay ]</code>	<code>:auto démarrage</code>
<code>{4}</code>	<code>:4 fois par seconde</code>
<code>{XXX}</code>	<code>:base du nom fichier</code>
<code>{1}</code>	<code>:numero de début</code>
<code>{2}</code>	<code>:numero de fin</code>

### 31.2 Animateinline

```
\begin{animateinline}[controls,loop,autoplay]{5}

% première image
\begin{tikzpicture} \fill[blue] (45:2) - - (135:.5) - - (225:2) - - (315:.5)
- - cycle; \fill[blue] (45:.5) - - (135:2) - - (225:.5) - - (315:2) - - cycle;
\end{tikzpicture}
% deuxième
\newframe
\begin{tikzpicture}
\fill[blue] (0:2) - - (90:.5) - - (180:2) - - (270:.5) - - cycle;
\fill[blue] (0:.5) - - (90:2) - - (180:.5) - - (270:2) - - cycle;
\end{tikzpicture}

\end{animateinline}
```



### 31.3 Multiframe

```
\begin{animateinline}[poster=first,controls, palindrome]{12}
\multiframe{29}{iAngle=80+10, Rdim=2.0+-0.2}{
\begin{tikzpicture}
\fill[blue] (\iAngle+45:\Rdim) - - (\iAngle+135:.5)- -
(\iAngle+225:\Rdim)- -(\iAngle+315:.5) - - cycle;
\fill[blue] (\iAngle+45:.5) - - (\iAngle+135:\Rdim)- - (\iAn-
gle+225:.5)- -(\iAngle+315:\Rdim) - - cycle;
\end{tikzpicture} }
\end{animateinline}
```

L'initiale de la variable définit son type

entier	initiale : i ou I
réelles	initiale : n, N, r ou R
longueurs	initiale : d ou D

```
\begin{animateinline}[autoplay,loop]{12}
\multiframe{24}{iAngle=0+15,icol=0+5}{\begin{tikzpicture}
\draw[line width=0pt] (-2,-3) rectangle(6,3);
\draw (0,0) node[fill=white,circle,rotate=\iAngle]
{\includegraphics[width=2cm]{LogoIUT}} (0,0) circle (1);
\draw (0,0) circle (1);
\coordinate (abc) at ($\sqrt{9-\sin(\iAngle)*\sin(\iAngle))+\cos(\iAngle)}*(1,0)$
;
\coordinate (xyz) at (\iAngle:1);
\draw[ultra thick] (0,0) - -(xyz);
\draw[ultra thick] (xyz) - - (abc) ;
\fill[color=blue!\icol] (abc)++(0.5,-1) rectangle (5,1) ;
\draw[ultra thick] (abc) ++(0,-1) rectangle ++(.5,2) ;
\draw[ultra thick] (1.5,1) - - (5,1) - - (5,-1) - - (1.5,-1);
\fill[red] (xyz) circle (4pt);
\fill[red] (abc) circle (4pt);
\end{tikzpicture}}
\end{animateinline}
```

Charger l'extension: `\usepackage{tkz-tab}` [3]

### 31.4 Déclaration du tableau

1° ligne	a	b	c
2° ligne			

```
\begin{tikzpicture}
\tkzTabInit{1° ligne / 1 ,2° ligne /1 } { a , b, c }
\end{tikzpicture}
```

### 31.4.1 Options

Hauteur des ligne		
1° ligne	a	b c
2° ligne		
3° ligne		

`\tikz \tkzTabInit{1° ligne '/1 , 2° ligne /.5 , 3° ligne /1.5 }{a , b , c };`

Largeur de la première colonne		
$x$	a	b c

`\tkzTabInit[lgt=4]{  $x$  / 1}{ a , b , c };`  
Par défaut : : lgt==2 cm

Espaceur entre deux valeurs		
$x$	a	b c

`\tkzTabInit[espcl=1]{  $x$  / 1}{ a , b , c };`  
Par défaut : : espcl=2 cm

Marge de début et de fin		
$x$	a	b c

`\tkzTabInit[deltacl=1]{  $x$  / 1}{ a , b , c };`  
Par défaut : : deltacl=0.5 cm

Épaisseur des lignes du tableau			
$x$	a	b	c
$\backslash\mathrm{tkzTabInit}[\mathrm{dlw}=2\mathrm{pt}]\{x / 1\}\{a, b, c\};$ Par défaut : : lw=0,4 pt			

Absence de cadre			
$x$	a	b	c
$\backslash\mathrm{tkzTabInit}[\mathrm{nocadre}]\{x / 1\}\{a, b, c\};$ Par défaut : : nocadre=false			

Mise en couleur			
\tkzTabInit [color,colorT = yellow]{1°ligne/1 , 2°ligne/1}{ a , b }			
1°ligne	a	b	
2°ligne			
[color,colorT = yellow]		[color,colorC = cyan]	
1°ligne	a	b	
2°ligne			
[color,colorL = green]		[color,colorV = magenta]	
Par défaut : : color = false		colorT=colorC=colorL=colorV =white	

31.5 Création d’une ligne de signes

$x$	a	b	c
$f(x)$	2	4	
$\backslash\mathrm{tkzTabLine}\{\mathrm{t}, 2,\mathrm{t},4,\mathrm{t}\}$			
$x$	a	b	c
$f(x)$	2	4	
$\backslash\mathrm{tkzTabLine}\{\mathrm{d}, 2,\mathrm{d},4,\mathrm{d}\}$			
$x$	a	b	c
$f(x)$	0	2	0
$\backslash\mathrm{tkzTabLine}\{\mathrm{z}, 2,\mathrm{z},4,\mathrm{z}\}$			
$x$	a	b	c
$f(x)$	1	3	4
$\backslash\mathrm{tkzTabLine}\{1,\mathrm{h}, 3,4,\mathrm{h}\}$			

Exemple					
$x$	$-\infty$	$-4$	$4$	$10$	$+\infty$
$f(x)$	$\vdots$	$+$		$-$	$\vdots$
			$0$		$+$

```

\begin{tikzpicture}
\tkzTabInit[espc1=1.5]{ $x$  / 1 ,  $f(x)$  / 1 } {  $-\infty$  ,  $-4$  ,  $4$  ,  $10$  ,  $+\infty$  }
\tkzTabLine{ t,+ , d , h , d,-,z,+ }
\end{tikzpicture}

```

### 31.6 Création d'une ligne de variations

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$\backslash\text{tkzTabVar}\{+/1, -/2\}$	$\backslash\text{tkzTabVar}\{-/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$\backslash\text{tkzTabVar}\{-/1, -/2\}$	$\backslash\text{tkzTabVar}\{+/1, +/2\}$																

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$\backslash\text{tkzTabVar}\{+C/1, -/2\}$	$\backslash\text{tkzTabVar}\{-C/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td><math>\longrightarrow</math></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$x$	a	b	c														
$f(x)$	1	$\longrightarrow$	2														
$\backslash\text{tkzTabVar}\{-/1, -C/2\}$	$\backslash\text{tkzTabVar}\{+/1, +C/2\}$																

<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2
$x$	a	b	c														
$f(x)$	1		2														
$x$	a	b	c														
$f(x)$	1		2														
$\backslash\text{tkzTabVar}\{+H/1, -/2\}$	$\backslash\text{tkzTabVar}\{-H/1, +/2\}$																
<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2	<table><tr><td><math>x</math></td><td>a</td><td>b</td><td>c</td></tr><tr><td><math>f(x)</math></td><td>1</td><td></td><td>2</td></tr></table>	$x$	a	b	c	$f(x)$	1		2
$x$	a	b	c														
$f(x)$	1		2														
$x$	a	b	c														
$f(x)$	1		2														
$\backslash\text{tkzTabVar}\{-/1, -H/2\}$	$\backslash\text{tkzTabVar}\{+/1, +H/2\}$																

$x$	a	b	c
$f(x)$	1	$\longrightarrow$	2

$x$	a	b	c
$f(x)$	1	$\nearrow$	2

$\backslash\text{tkzTabVar}\{+\textcolor{red}{D}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{D}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2
$x$	a	b	c
$f(x)$	1	$\nearrow$	2
$\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{D}/2\}$	$\backslash\text{tkzTabVar}\{+/1,+\textcolor{red}{D}/2\}$		
$x$	a	b	c
$f(x)$		1	$\searrow$
$x$	a	b	c
$f(x)$		1	$\nearrow$
$\backslash\text{tkzTabVar}\{\textcolor{red}{D}+/1,-/2\}$	$\backslash\text{tkzTabVar}\{\textcolor{red}{D}-/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\longrightarrow$	2
$x$	a	b	c
$f(x)$	1	$\nearrow$	2
$\backslash\text{tkzTabVar}\{-/1,\textcolor{red}{D}-/2\}$	$\backslash\text{tkzTabVar}\{+/1,\textcolor{red}{D}+/2\}$		
$x$	a	b	c
$f(x)$	1		2
$x$	a	b	c
$f(x)$	1		2
$\backslash\text{tkzTabVar}\{+\textcolor{red}{DH}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{DH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2
$x$	a	b	c
$f(x)$	1	$\nearrow$	2
$\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{DH}/2\}$	$\backslash\text{tkzTabVar}\{+\textcolor{red}{DH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1		2
$x$	a	b	c
$f(x)$	1		2
$\backslash\text{tkzTabVar}\{+\textcolor{red}{CH}/1,-/2\}$	$\backslash\text{tkzTabVar}\{-\textcolor{red}{CH}/1,+/2\}$		
$x$	a	b	c
$f(x)$	1	$\searrow$	2
$x$	a	b	c
$f(x)$	1	$\nearrow$	2
$\backslash\text{tkzTabVar}\{-/1,-\textcolor{red}{CH}/2\}$	$\backslash\text{tkzTabVar}\{+/1,+\textcolor{red}{CH}/2\}$		

$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +D-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -D+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -D-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +D+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +CD-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -CD+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -CD-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +CD+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +DC-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -DC+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -DC-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +DC+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +V-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -V+/2 , -/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ +/1 , -V-/2 , +/3 }			
$x$	a	b	c
$f(x)$	1 $\rightarrow$ 2	2 $\rightarrow$ 3	
\tkzTabVar{ -/1 , +V+/2 , -/3 }			

Mise en évidence d'une valeur			
$x$	a	b	c
$f(x)$	1	2	3

$\backslash\mathrm{tkzTabVar}\{+/1, -V-/\colorbox{yellow}{2}, +/3\}$

Variation sur plusieurs colonnes			
$x$	a	b	c
$f(x)$	1	→ 3	

$\backslash\mathrm{tkzTabVar}\{-/1, \textcolor{red}{R}/, +/3\}$

Valeurs intermédiaires

$x$	$x$
$a \quad A \quad b \quad c$	$a \quad b \quad A \quad c$
$f(x)$	$f(x)$
$1 \xrightarrow{x} 3$	$1 \xrightarrow{x} 3$

$\backslash\mathrm{tkzTabVal}\{1\}\{3\}\{0.25\}\{A\}\{x\}$

$\backslash\mathrm{tkzTabVal}\{1\}\{3\}\{0.75\}\{A\}\{x\}$


$x$	a	A	b	c
		⋮		
$f(x)$	1	x	→ 3	






$\backslash\mathrm{tkzTabVal}[\textcolor{red}{draw}]\{1\}\{3\}\{0.25\}\{A\}\{x\}$

Ajout d'images									
$x$	a	b	c	d	$x$	a	b	c	d
$f(x)$	1	→ 3			$f(x)$	1	→ 3		

$\backslash\mathrm{tkzTabIma}\{1\}\{4\}\{\textcolor{red}{2}\}\{x\}$ 
 $\backslash\mathrm{tkzTabIma}\{1\}\{4\}\{\textcolor{red}{3}\}\{x\}$

## 32 Les modules étudiés dans ce document

module de base TikZ :		
nom	A insérer dans le préambule	documentation <sup>1</sup>
tikz	<code>\usepackage{tikz}</code>	pgfmanual.pdf 

Autres modules		
nom	voir page	documentation <sup>2</sup>
animate	176	animate.pdf 
tikz-optics	166	tikz-optics.pdf 
pgfplots	128	pgfplots.pdf 
tikzpeople	116	tikzpeople.pdf 
tkz-tab	177	tkz-tab-screen.pdf 

Compléments optionnels (documentation : pgfmanual.pdf)		
nom	voir page	A insérer dans le préambule
angles	36	<code>\usetikzlibrary{angles}</code>
arrows.meta	20	<code>\usetikzlibrary{arrows.meta}</code>
bending	33	<code>\usetikzlibrary{bending}</code>
backgrounds	62	<code>\usetikzlibrary{backgrounds}</code>
calc	43	<code>\usetikzlibrary{calc}</code>
circuits.ee.IEC	156	<code>\usetikzlibrary{circuits.ee.IEC}</code>
circuits.logic.IEC	162	<code>\usetikzlibrary{circuits.logic.IEC}</code>
circuits.logic.US	162	<code>\usetikzlibrary{circuits.logic.US}</code>
circuits.logic.CDH	162	<code>\usetikzlibrary{circuits.logic.CDH}</code>
fit	52	<code>\usetikzlibrary{fit}</code>
decorations.footprints	103	<code>\usetikzlibrary{decorations.footprints}</code>
decorations.fractals	110	<code>\usetikzlibrary{decorations.fractals}</code>
decorations.markings	100	<code>\usetikzlibrary{decorations.markings}</code>
decorations.pathmorphing	89	<code>\usetikzlibrary{decorations.pathmorphing}</code>
decorations.pathreplacing	95	<code>\usetikzlibrary{decorations.pathreplacing}</code>
decorations.shapes	104	<code>\usetikzlibrary{decorations.shapes}</code>
decorations.text	108	<code>\usetikzlibrary{decorations.text}</code>
fadings	67	<code>\usetikzlibrary{fadings}</code>
intersections	42	<code>\usetikzlibrary{intersections}</code>
patterns	16	<code>\usetikzlibrary{patterns}</code>
plotmarks	127	<code>\usetikzlibrary{plotmarks}</code>
scopes	59	<code>\usetikzlibrary{scopes}</code>
shadings	19	<code>\usetikzlibrary{shadings}</code>
shapes.arrows	79	<code>\usetikzlibrary{shapes.arrows}</code>
shapes.callouts	81	<code>\usetikzlibrary{shapes.callouts}</code>
shapes.geometric	74	<code>\usetikzlibrary{shapes.geometric}</code>
shapes.misc	83	<code>\usetikzlibrary{shapes.misc}</code>
shapes.multipart	85	<code>\usetikzlibrary{shapes.multipart}</code>
shapes.symbols	77	<code>\usetikzlibrary{shapes.symbols}</code>
trees	154	<code>\usetikzlibrary{trees}</code>







<sup>1</sup> voir dans le répertoire : `\texlive\2016\tesmf-dist\doc\generic\pgf`

<sup>2</sup> chercher dans le répertoire : `\texlive\2016\tesmf-dist\doc\latex`



dans une prochaine mise à jour	
automata	<a href="#">PGFmanual section : 41</a>
babel	<a href="#">PGFmanual section : 42</a>
calendar	<a href="#">PGFmanual section : 45</a>
chains	<a href="#">PGFmanual section : 46</a>
circular graph drawing library	<a href="#">PGFmanual section : 32</a>
curvilinear library	<a href="#">PGFmanual section : 103-4-7</a>
datavisualization library	<a href="#">PGFmanual section : 75</a>
datavisualization.formats.functions library	<a href="#">PGFmanual section : 76-4</a>
datavisualization.polar library	<a href="#">PGFmanual section : 80</a>
er	<a href="#">PGFmanual section : 49</a>
examples graph drawing library	<a href="#">PGFmanual section : 35-8</a>
external	<a href="#">PGFmanual section : 50</a>
fixedpointarithmetic	<a href="#">PGFmanual section : 53</a>
folding	<a href="#">PGFmanual section : 59</a>
force graph drawing library	<a href="#">PGFmanual section : 31</a>
fpu	<a href="#">PGFmanual section : 54</a>
graph.standard library	<a href="#">PGFmanual section : 19-10</a>
graphdrawing library	<a href="#">PGFmanual section : 27</a>
graphs library	<a href="#">PGFmanual section : 19</a>
layered graph drawing library	<a href="#">PGFmanual section : 30</a>
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turtle	<a href="#">PGFmanual section : 73</a>

## References

- |                        |                |   |   |
|------------------------|----------------|---|---|
| [1] pgfmanual.pdf      | version 3.0.1a | 1161 pages  |  |
| [2] pgfplots.pdf       | version 1.80   | 439 pages   |    |
| [3] tkz-tab-screen.pdf | version 1.1c   | 83 pages  |   |
| [4] tikzpeople.pdf     | 19 pages       |  |   |
| [5] animate.pdf        | 26 pages       |  |   |
| [6] tikz-optics.pdf    | version 0.2.2  | 39 pages  |   |

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5. Extrémités

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