

Visual TikZ

Version 0.61

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Objectives :

- an image per command or parameter.
- the minimum text possible.
- the most complete possible update after update.
- keeping the same structure as VisualPSTricks

Remarks : Minimal code given to show the effect of a command or a parameter. The effects are sometime exaggerated .To consult the documentation, I have given the number of the

Section in pgfmanual

You can contact me at my personal email to

- let me know the mistakes found
- give me your commentaries, your suggestions ...

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This work has the LPPL maintenance status ‘maintained’.

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

Thanks to:

Till Tantau

Alain Matthes

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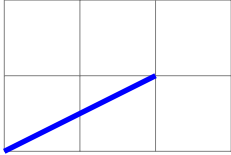
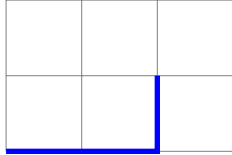
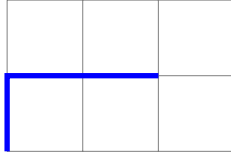
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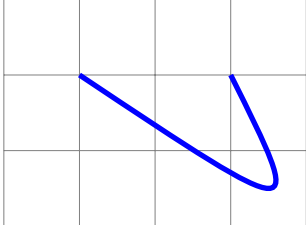
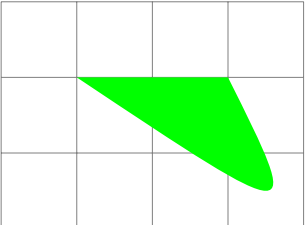
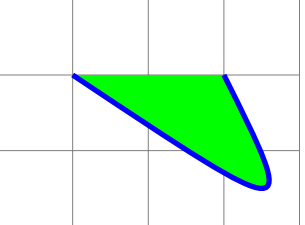
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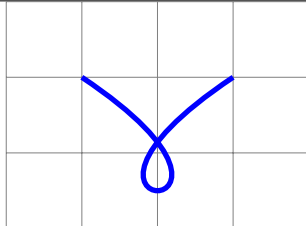
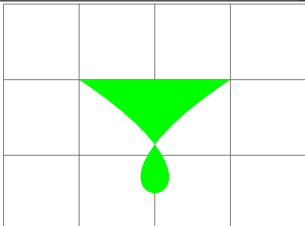
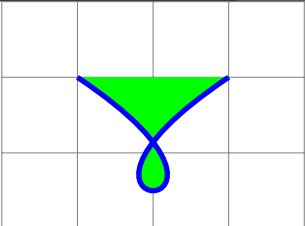
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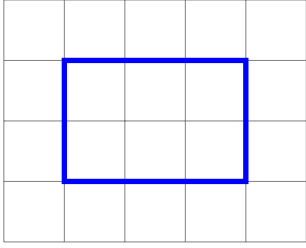
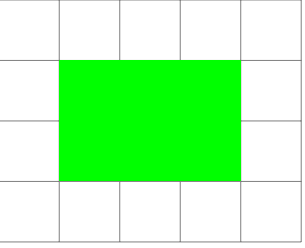
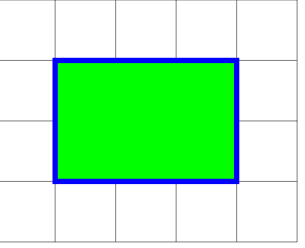
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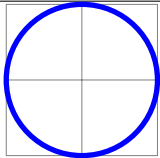
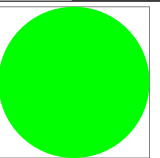
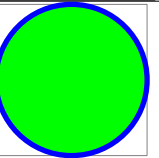
1 Basic figures

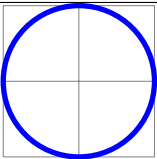
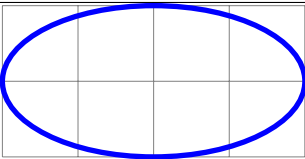
<code>\draw (0,0) -- (2,1);</code>	PGFmanual section : 14-2	<code>\draw (0,0) - (2,1);</code>	<code>\draw (0,0) - (2,1);</code>
			

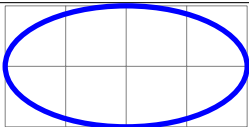
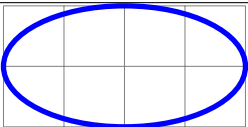
<code>\draw (0,2) .. controls (3,0) .. (2,2);</code>				PGFmanual section : 14-3
				
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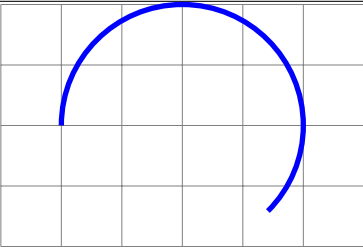
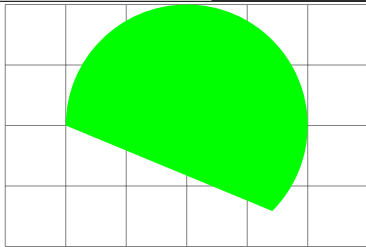
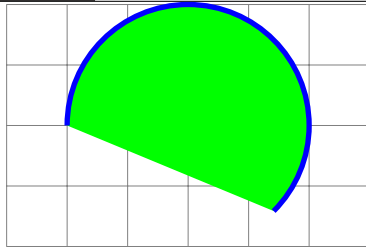
<code>\draw (0,2) .. controls (3,0) and (-1,0) .. (2,2);</code>				PGFmanual section : 14-3
				
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>		

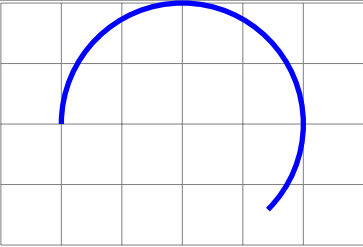
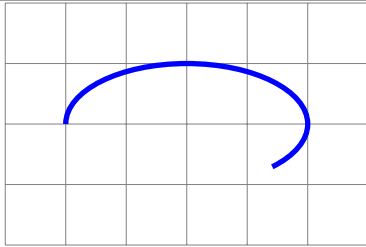
<code>\draw (0,0) rectangle (3,2);</code>				PGFmanual section : 14-4
				
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>		

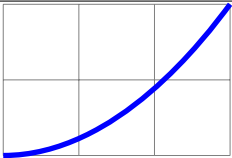
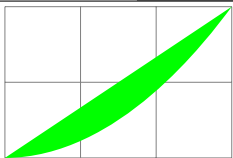
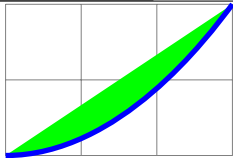
<code>\draw (1,1) circle (1);</code>				PGFmanual section : 14-6
				
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>		

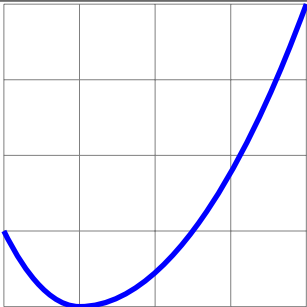
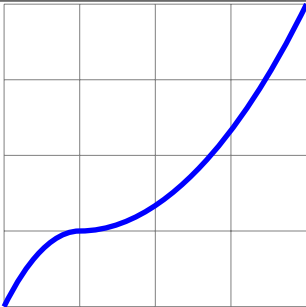
<code>\draw (1,1) circle [radius=1cm];</code>	<code>\draw (1,1) ellipse [x radius=2cm,y radius=1cm]</code>
	
radius=1cm	x radius=2cm,y radius=1cm

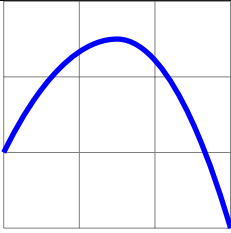
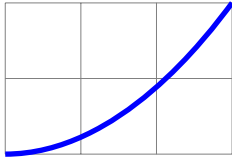
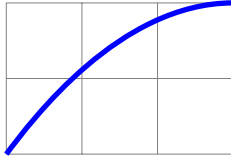
<code>\draw (1,1) circle (2 and 1);</code>	<code>\draw (1,1) ellipse (2 and 1);</code>
	

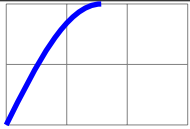

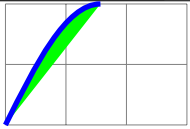
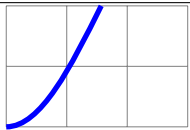

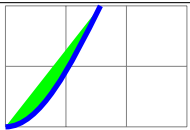
<code>\draw (-2,0) arc (180:-45:2);</code> PGFmanual section : 14-7		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

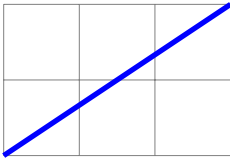
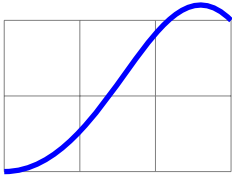
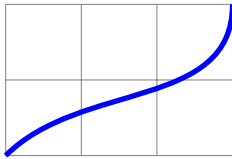
<code>\draw (-2,0) arc [start angle=-20, end angle=135,radius=1]</code>	<code>\draw (-2,0) arc (180:-45:2 and 1)</code>
	
radius=1	x radius=1,y radius=.5

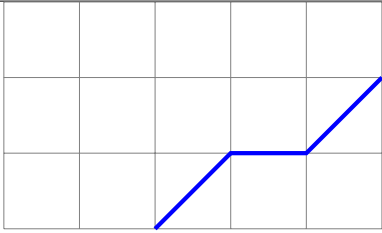
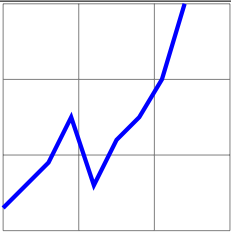
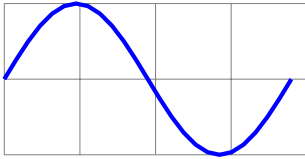
<code>\draw (0,0) parabola (3,2);</code> PGFmanual section : 14-9		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>

	
<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>


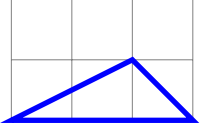
<code>\draw (0,0) sin (1.57,2);</code> PGFmanual section : 14-10		
		
<code>\draw</code>	<code>\fill</code>	<code>\filldraw</code>
		
<code>\draw (0,0) cos (1.57,2);</code>		

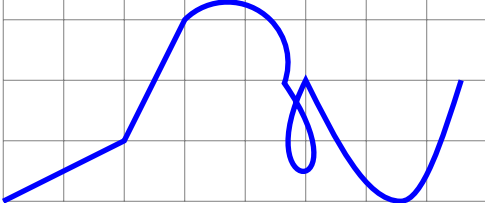
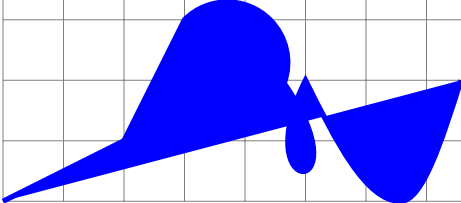
PGFmanual section : 14-13		
		
<code>\draw (0,0) to (3,2);</code>	<code>\draw[out=0] (0,0) to (3,2);</code>	<code>\draw[in=-90] (0,0) to (3,2);</code>
voir section 6.2 page 46		

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 114		

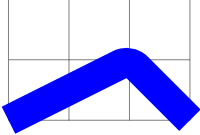
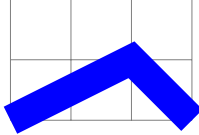
2 Path

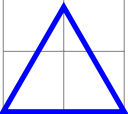
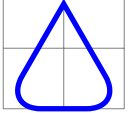
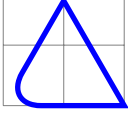
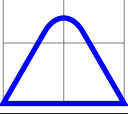
PGFmanual section : 14

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

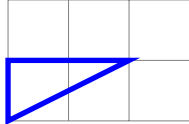
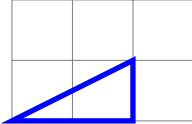
<code>\draw (0,0) – (2,1) – (3,3) arc (135:-20:1) .. controls (6,0) and (4,0) .. (5,2) sin (6.57,0) cos (7.57,2) ;</code>	
	
<code>\draw</code>	<code>\filldraw</code>

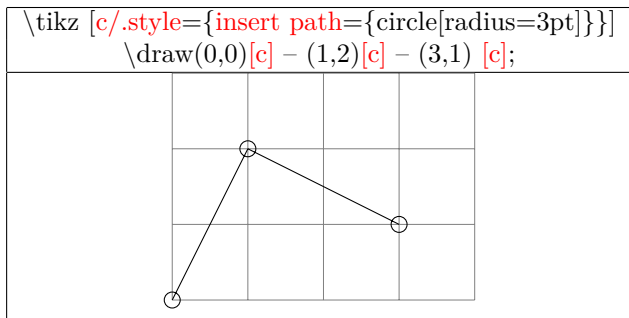
PGFmanual section : 14-5

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

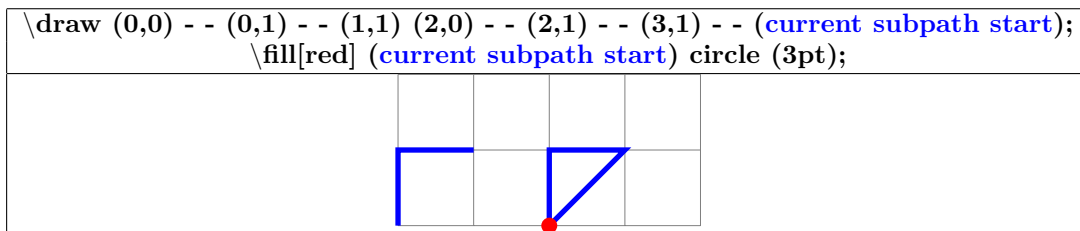
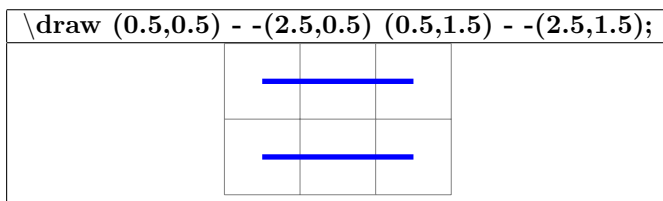
	<code>\draw [rounded corners=0.5cm] (0,0) – – (1,1.732) – – (2,0) – – cycle ;</code>
	<code>\draw (0,0) – – (1,1.732) [rounded corners=0.5cm] – – (2,0) – – cycle ;</code>
	<code>\draw (0,0) – – (1,1.732) – – (2,0)[rounded corners=0.5cm] – – cycle ;</code>
	<code>\draw [rounded corners=0.5cm] (0,0) –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

PGFmanual section : 14-2-2

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



Coupure de chemin PGFmanual section : 14-1



3 Parameters

3.1 Line width

PGFmanual section : 15-3-1			
\tikz \draw[line width=.2cm] (0,0) - - (1,1);			
[line width=.2cm]	[ultra thin] (0.1pt)	[very thin] (0.2pt)	[thin] (0.4pt)
[semithick] (0.6pt)	[thick] (0.8pt)	[very thick] (1.2pt)	[ultra thick] (1.6pt)

3.2 Dimensions available

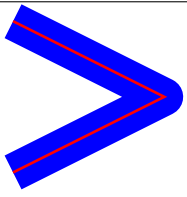
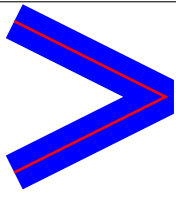
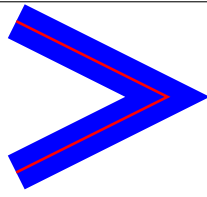
	\draw[line width=10pt] (2,0) to (2,1);
	\draw[line width=10bp] (2,0) to (2,1);
	\draw[line width=10mm] (2,0) to (2,1);
	\draw[line width=1cm] (2,0) to (2,1);
	\draw[line width=1in] (2,0) to (2,1);

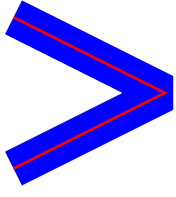
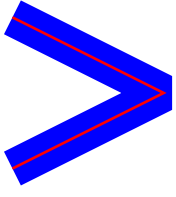
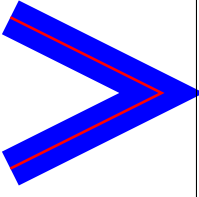
	\draw[line width=1ex] (0,0.5) to (4,.5);
	\Huge \draw[line width=1ex] (0,0.5) to (4,.5);
	\draw[line width=1em] (2,0) to (2,1);
	\Huge \draw[line width=1em] (2,0) to (2,1);

3.3 Extremities

[line cap=rect]	[line cap=butt]	[line cap=round]

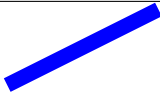

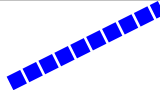

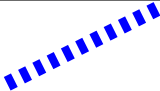
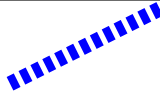
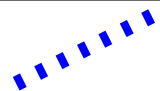
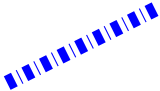
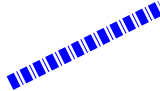
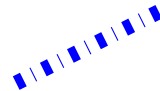
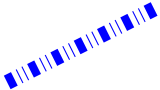

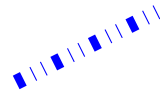
3.4 Lines junction



\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); (By default : miter limit=10)		
		
miter limit=1	miter limit=2	miter limit=3


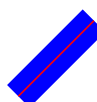


3.5 Line styles



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]	

PGFmanual section : 15-3-4

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

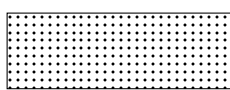


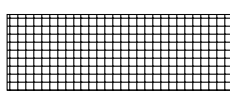
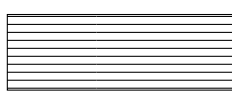
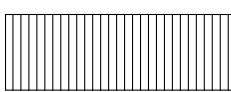


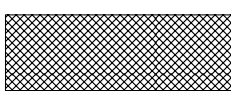

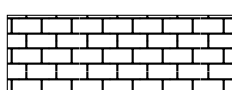

\Huge = \tikz \draw[double equal sign distance] (0,0) - - (4,0);	
	
\Huge	\large

3.6 Fillings



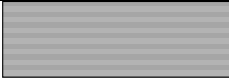
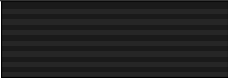
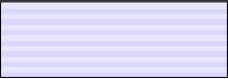

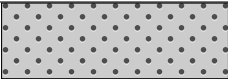

PGFmanual section : 15-5-1

PGFmanual section : 60

Load package : \usetikzlibrary{patterns}

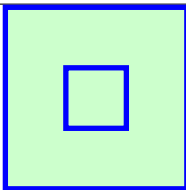
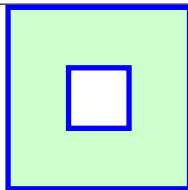
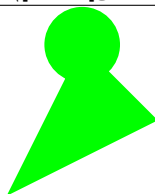
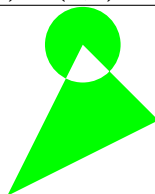
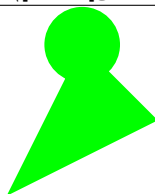
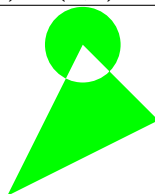
\draw[pattern= dots] (0,0) - - (3,1);		
		
dots	fivepointed stars	sixpointed stars
		
grid	horizontal lines	vertical lines
		
north east lines	north west lines	crosshatch
		
crosshatch dots	bricks	checkerboard


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

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




3.7 Filling rule

PGFmanual section : 15-5-2

nonzero rule (By default)			
			
\filldraw [fill=green!20] (0,0) -- (0,3) -- (3,3) -- (3,0) -- cycle (1,1) -- (1,2) -- (2,2) -- (2,1) -- cycle ;		\filldraw [fill=green!20] (0,0) -- (0,3) -- (3,3) -- (3,0) -- cycle (1,1) -- (2,1) -- (2,2) -- (1,2) -- cycle;	
even odd rule			
\[fill=[green] (0,0) -- (2,1) -- (1,2) circle (.5cm);		\filldraw[fill=green] (0,0) -- (2,1) -- (1,2) circle (.5cm);	
			
[fill=green]		[even odd rule,fill=green]	
			
[fill=green]		[even odd rule,fill=green]	

3.8 Filling with picture

PGFmanual section : 15-6

\draw [path picture ={\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

3.9 Shading

3.9.1 Shadings available

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>

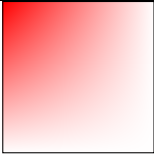

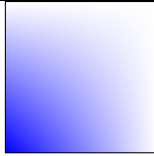
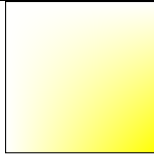
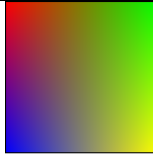
<code>shading angle=90</code>	<code>right color=green</code> <code>[shading angle=45]</code>	<code>left color=red</code> <code>shading angle=-45</code>

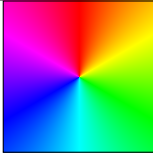
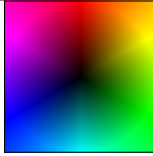

<code>inner color=red</code>	<code>outer color=green</code>	<code>inner color=red outer color=green</code>

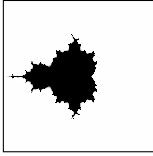
3.9.2 Shading library

PGFmanual section : 65

Load package : `\usetikzlibrary{shadings}`





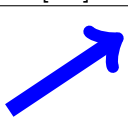
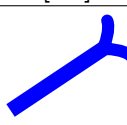
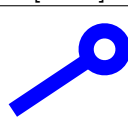
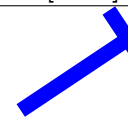
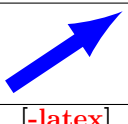
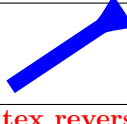


\shadedraw[upper left=red] (0,0) rectangle (2,2) ;				
				
upper left=red	upper right=green	lower left=blue	lower right=yellow	

\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

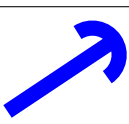
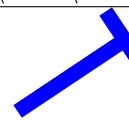
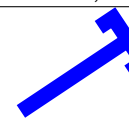
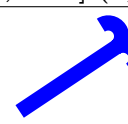
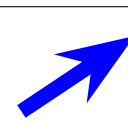
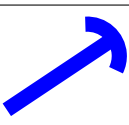
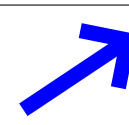
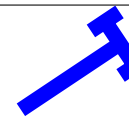
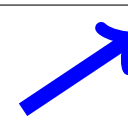
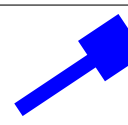
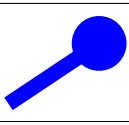
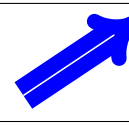
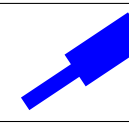
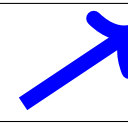
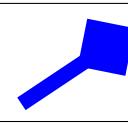


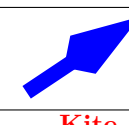
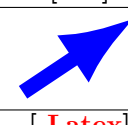
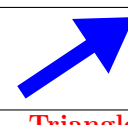
3.10 Extremities

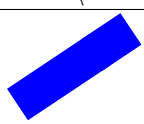
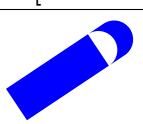
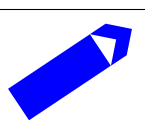
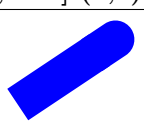
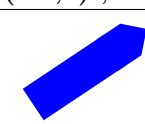
3.10.1 TikZ package


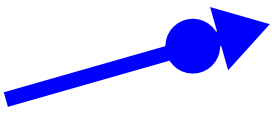
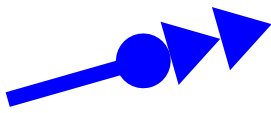
\tikz \draw[->,line width=.2cm,blue] (0,0) - - (1.5,1);			
			
<code>[->]</code>	<code>[<-]</code>	<code>[<->]</code>	<code>[>->]</code>
			
<code>[-to]</code>	<code>[-to reversed]</code>	<code>[-o]</code>	<code>[-]</code>
			
<code>[-latex]</code>	<code>[-latex reversed]</code>	<code>[-stealth]</code>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





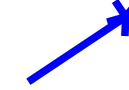





3.10.2 “library arrow.meta”

Load package : \usetikzlibrary{arrows.meta}






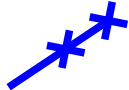

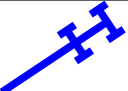






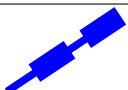
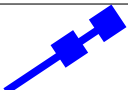


\tikz \draw[-Arc Barb,line width=.2cm,blue] (0,0) - - (1.5,1) ;				
				
<code>-Arc Barb</code>	<code>-Bar</code>	<code>-Bracket</code>	<code>-Hooks</code>	<code>-Stealth</code>
				
<code>-Parenthesis</code>	<code>-Straight Barb</code>	<code>-Tee Barb</code>	<code>-Classical TikZ Rightarrow</code>	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




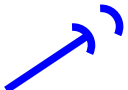

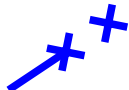

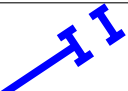
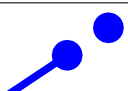





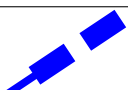
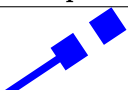
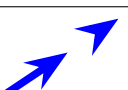
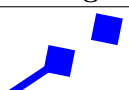
\tikz \draw[-Butt Cap,line width=.2cm,blue] (0,0) - - (1.5,1) ;				
				
<code>-Butt Cap</code>	<code>-Fast Round</code>	<code>-Fast Triangle</code>	<code>-Round Cap</code>	<code>-Triangle Cap</code>

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

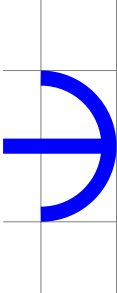
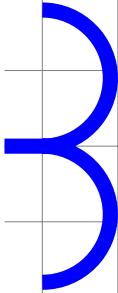
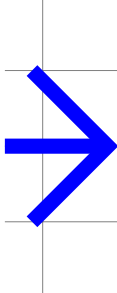
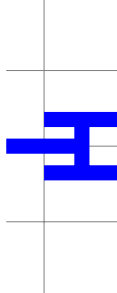
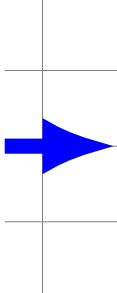
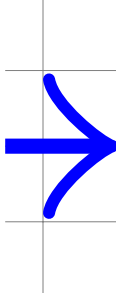
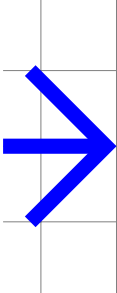
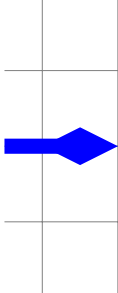
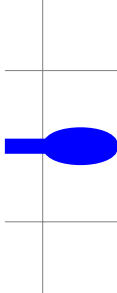
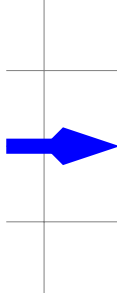
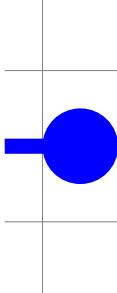

\tikz \draw[-Rays,line width=.1cm,blue] (0,0) - - (1.5,1);				
				
Rays	{Rays[n=2]}	{Rays[n=3]}	{Rays[n=4]}	{Rays[n=5]}
				
{Rays[n=6]}	{Rays[n=7]}	{Rays[n=8]}	{Rays[n=9]}	{Rays[n=10]}

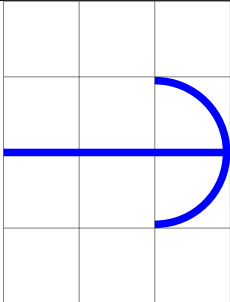
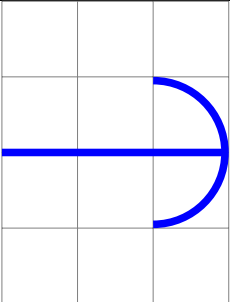
Parameter sep PGFmanual section : 16-4-2

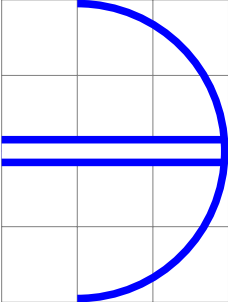
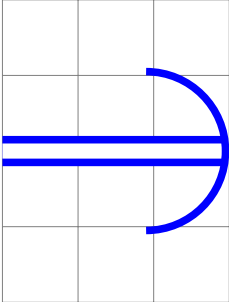
\tikz \draw[-{Arc Barb[sep=.25cm] Arc Barb[]},line width=.1cm,blue] (0,0) - - (1.5,1);					
					
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Rays
					
Straight Barb	Tee Barb	Circle	Ellipse	Computer Modern Rightarrow	Triangle
					
Latex	Kite	Rectangle	Square	Stealth	Turned Square

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

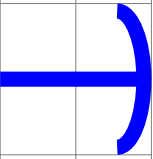
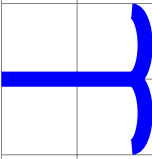
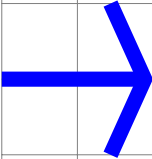
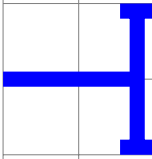
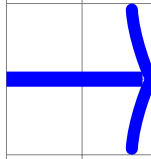
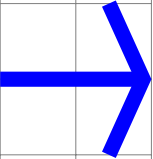
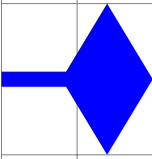
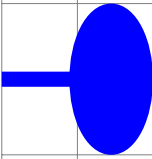
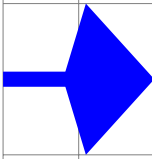
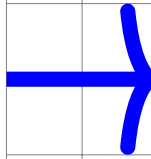
Parameter lenght PGFmanual section : 16-3-1


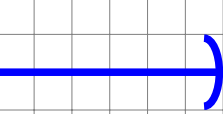
\tikz \draw[-{Arc Barb[length=1cm]},line width=.2cm,blue] (0,0) - - (1,1);					
					
Arc Barb	Hooks	Straight Barb	Tee Barb	Latex	Classical TikZ Rightarrow
					
Straight Barb	Diamond	Ellipse	Kite	Circle	Computer Modern Rightarrow

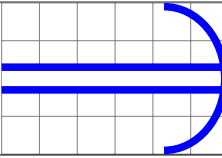
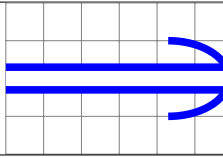
\tikz \draw[-{Arc Barb[length=0cm 10]},line width=.1cm,blue] (0,0) - - (3,1);	
	
[length=0cm 10]	[length=.5cm 5]
0cm + 10 x .1cm = 1cm	.5cm + 5 x .1cm = 1cm

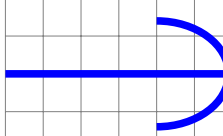
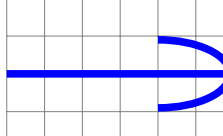
\tikz \draw[-{Arc Barb[length=0cm 5]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (1,1);	
	
[length=0cm 5]	[length=0cm 5 .6]
0cm + 5 x (.1cm + 2 mm + .1cm) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm)) = 11 mm

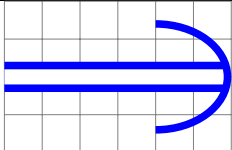
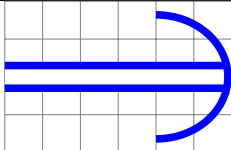
Parameter width PGFmanual section : 16-3-1

\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

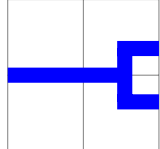
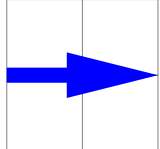
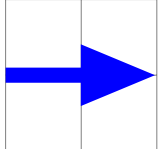
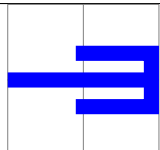
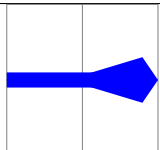
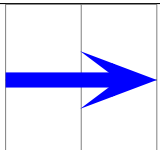
\tikz \draw[-{Arc Barb[width=0cm 10]},line width=.1cm,blue] (0,0) - - (3,1);	
	
[width=0cm 10]	[width=.5cm 5]
0cm + 10 x .1cm = 1cm	.5cm + 5 x .1cm = 1cm

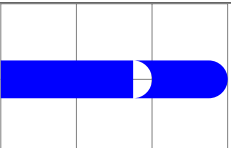
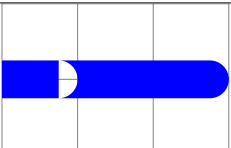
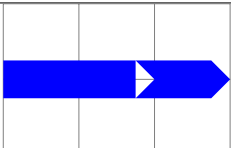
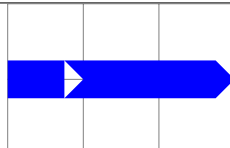
\tikz \draw[-{Arc Barb[width=0cm 5]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (3,1);	
	
[width=0cm 5]	[width=0cm 5 .6]
0cm + 5 x (.1cm + 2 mm + .1cm) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm)) = 11

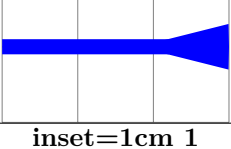
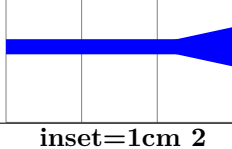
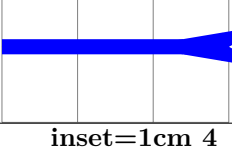
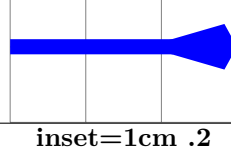
\tikz \draw[-{Arc Barb[length=1cm,width=0cm 1.5]},line width=.1cm,blue] (0,0) - - (3,1);	
	
[width'=0cm 1.5]	[width'=.5cm .5]
0cm + 1.5 x 1cm = 1.5cm	.5cm + .5 x 1cm = 1cm

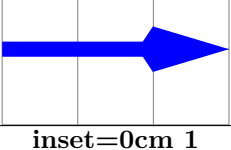
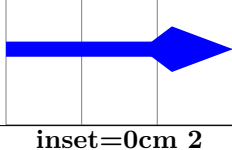
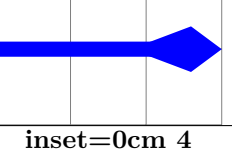
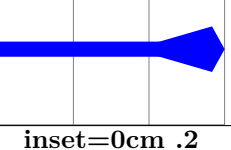
<code>\tikz \draw[-{Arc Barb[length=1cm,width'=0cm 1.5]},line width=.1cm,blue,double,double distance = 2</code>	
	
<code>[width'=0cm 1.5]</code>	<code>[width'=0cm 1.5 .6]</code>
$0\text{cm} + 1.5 \times 1\text{cm} = 1.5\text{cm}$	$0\text{cm} + 1.5 \times (.6 \times 1\text{cm} + (1-.6)(1\text{cm} + 2\text{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

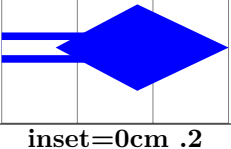
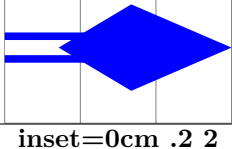
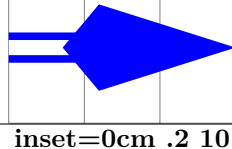
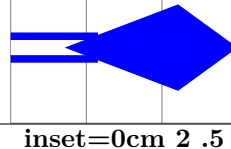
Parameter inset PGFmanual section : 16-3-1

<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

Parameter 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]

Parameter 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

Parameter arc PGFmanual section : 16-3-3


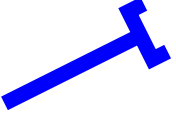

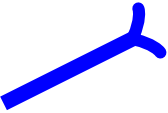
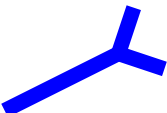
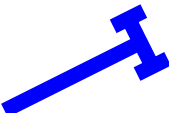
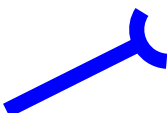
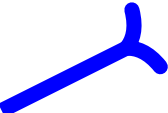
\tikz \draw[-{Arc Barb[arc=270]},line width=.2cm,blue] (0,0) - - (3,1);			
Arc Barb[arc=270]	Arc Barb[arc=360]	Hooks[arc=270]	Hooks[arc=360]

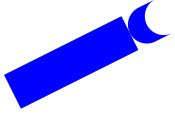
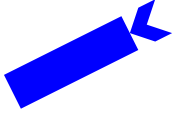
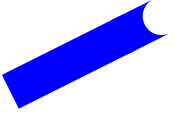

Parameter slant PGFmanual section : 16-3-4

\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


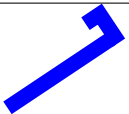





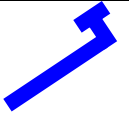






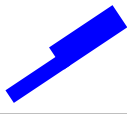
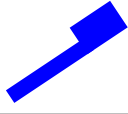


\tikz \draw[-{Arc Barb[slant=.5]},line width=.2cm,blue] (0,0) - - (1,1);				
				
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow
				
Straight Barb	Tee Barb	Circle	Diamond	Ellipse
				
Kite	Latex	Rectangle	Square	Stealth
				
Turned Square	Fast Round	Fast Triangle	Round Cap	Triangle Cap

Parameter reversed PGFmanual section : 16-3-5

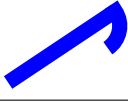
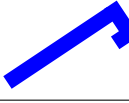
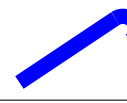
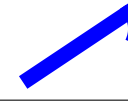
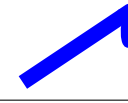
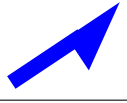
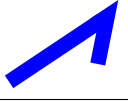
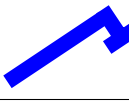
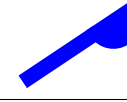
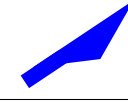
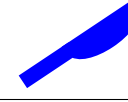
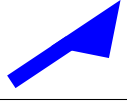


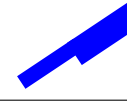
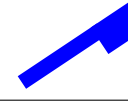

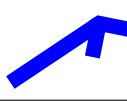
\tikz \draw[-{Arc Barb[reversed]},line width=.2cm,blue] (0,0) - - (2,1) ;			
			
Arc Barb	Bracket	Hooks	Classical TikZ Rightarrow
			
Straight Barb	Tee Barb	Parenthesis	Computer Modern Rightarrow

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








Parameter left PGFmanual section : 16-3-5








\tikz \draw[-{Arc Barb[left]},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

Parameter right PGFmanual section : 16-3-5

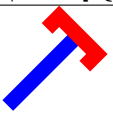
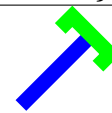
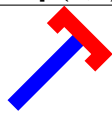
\tikz \draw[-{Arc Barb[right]},line width=.2cm,blue] (0,0) - - (1.5,1);					
					
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Triangle
					
Straight Barb	Tee Barb	Circle	Diamond	Ellipse	Turned Square
					
Kite	Latex	Rectangle	Square	Stealth	Rays


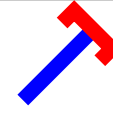




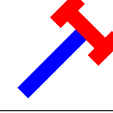
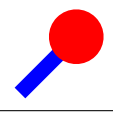
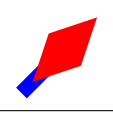
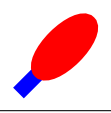
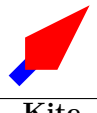


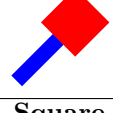



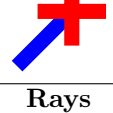
Parameter harpoon PGFmanual section : 16-3-5

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


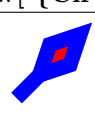
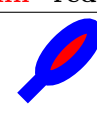
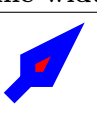
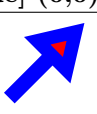

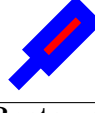
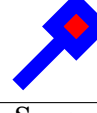

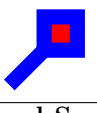
\tikz \draw[-{Arc Barb[harpoon,swap]},line width=.2cm,blue] (0,0) - - (1,1);						
						
Arc Barb	Bracket	Hooks	Parenthesis	Classical TikZ Rightarrow	Straight Barb	Tee Barb











Parameter color PGFmanual section : 16-3-6

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











\tikz \draw[-{Arc Barb[red],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
				
Triangle	Turned Square	Rays		

Parameter 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

Parameter 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

















Parameter 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

Parameter 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

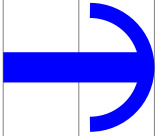
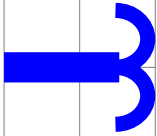
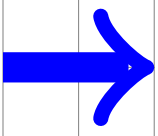
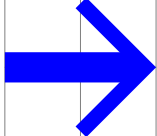
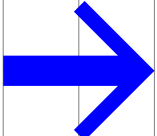
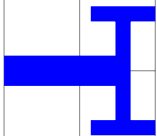
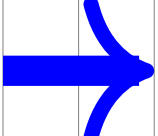
Parameter round PGFmanual section : 16-3-7

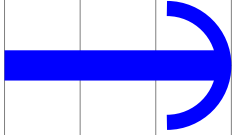
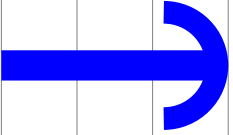
\tikz \draw[-{Arc Barb[round]},line width=.2cm,blue] (0,0) - - (1,1);							
							
Arc Barb	Bracket	Hooks	Parenthesis	Ellipse	Rectangle	Square	Stealth
							
Straight Barb	Tee Barb	Diamond	Kite	Latex	Triangle	Turned Square	Rays

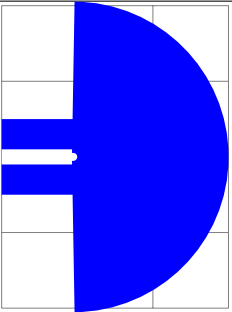
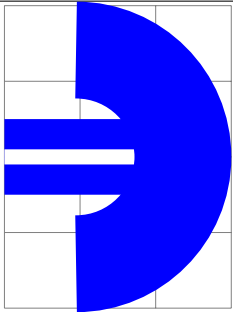
Parameter sharp PGFmanual section : 16-3-7

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

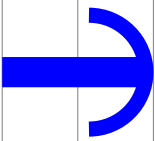
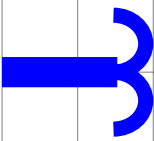
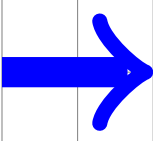
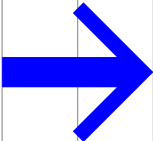
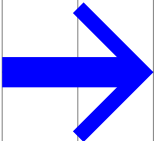
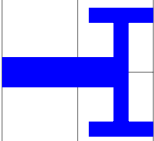
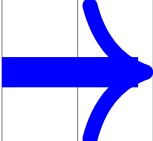
Parameter line width PGFmanual section : 16-3-7

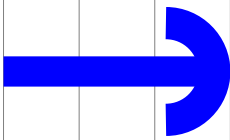
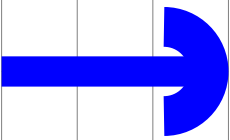
\tikz \draw[-{Arc Barb[line width=.2cm]},line width=.4cm,blue] (0,0) - - (2,0);			
			
Arc Barb	Hooks	Classical TikZ Rightarrow	Straight Barb
			
Straight Barb	Tee Bar	Computer Modern Rightarrow	

\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

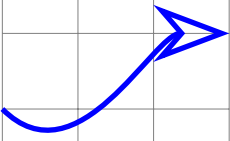
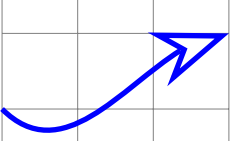
\tikz \draw[-{Arc Barb[length=0cm 5]},line width=.1cm,blue,double,double distance = 2 mm] (0,0) - - (11,0);	
	
[length=0cm 5]	[length=0cm 5 .6]
0cm + 5 x (.1cm + 2 mm + .1cm) = 2cm	0cm + 5 x (.6 x .1cm + (1-.6)(.1cm + 2 mm + .1cm)) = 11 cm

Parameter 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							

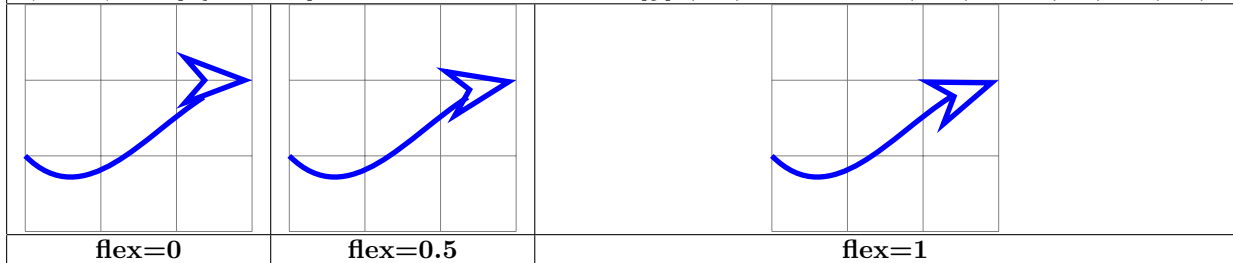
Parameter quick PGFmanual section : 16-3-8

\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]]							

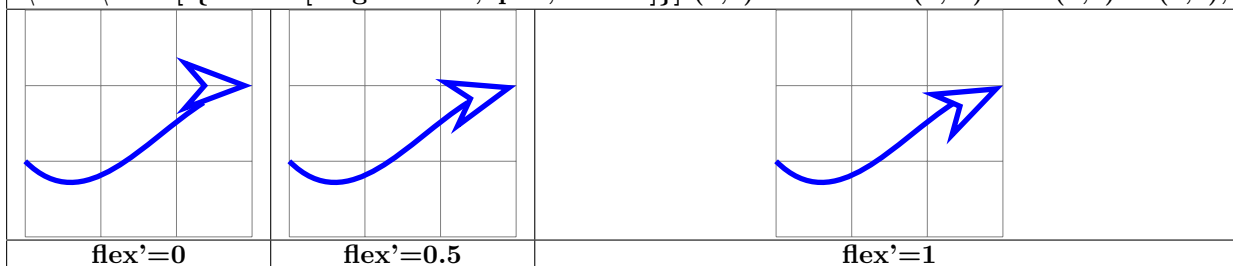
Parameter bending PGFmanual section : 16-3-8

Load package : `\usetikzlibrary{bending}`

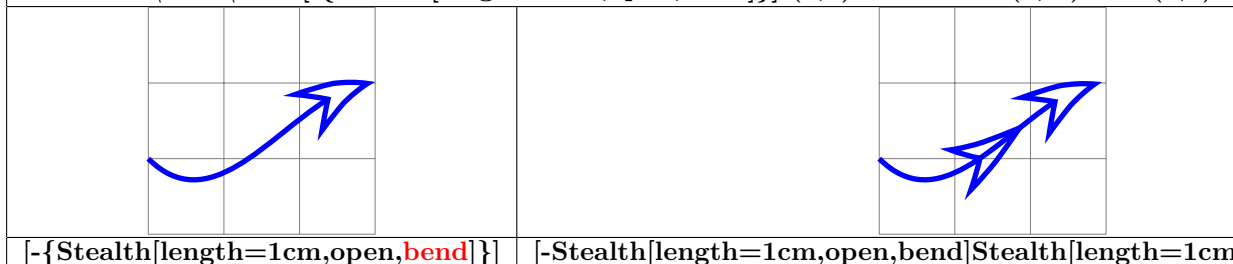
`\tikz \draw[-{Stealth[length=1cm,open,flex=0}}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);`



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

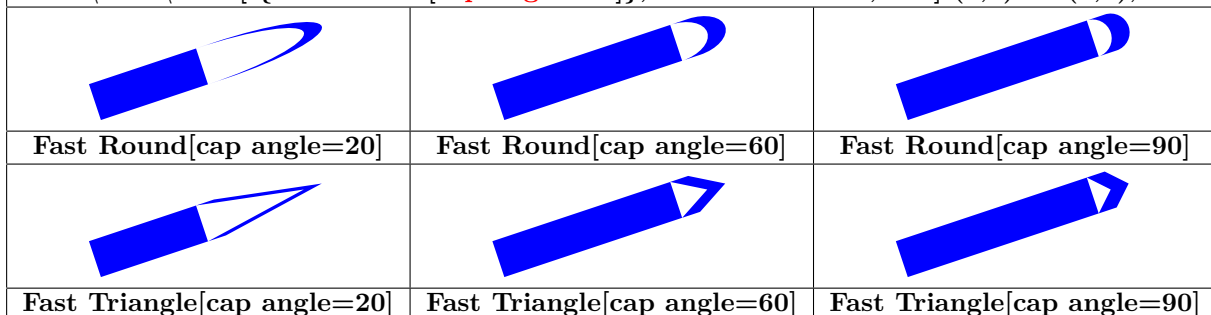


`\tikz \draw[-{Stealth[length=1cm,open,bend}}] (0,0) .. controls (1,-1) and (2,1) .. (3,1);`



Parameter cap angle PGFmanual section : 16-5-4

`\tikz \draw[-{Fast Round[cap angle=60}},line width=.2cm,blue] (0,0) - - (3,1);`




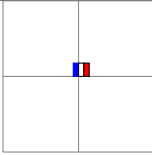
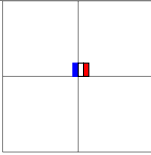
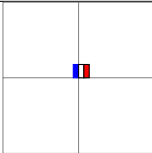
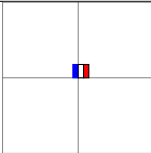
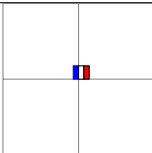
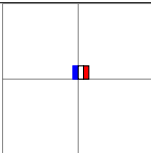
4 Small pictures

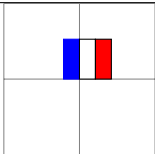
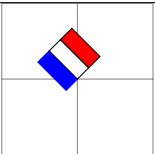
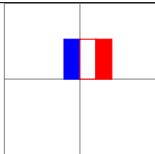
4.1 Own small pictures


PGFmanual section : 14-19

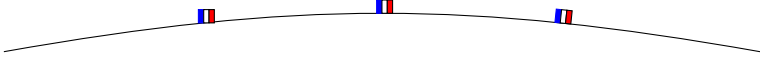
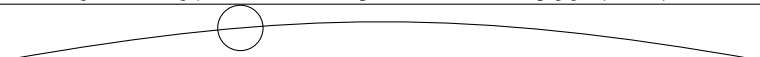
PGFmanual section : 18






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> 


Positioning	
	
<pre>\pic at (1,1) [pic type = dfr];</pre>	<pre>\pic at (1,1) {dfr};</pre>
	
<pre>\path (1,1) pic [pic type= dfr];</pre>	<pre>\path (1,1) pic {dfr};</pre>
	
<pre>\pic [at={(1,1)}] [pic type= dfr];</pre>	<pre>\pic [at={(1,1)}] {dfr};</pre>


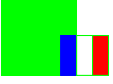
\pic[scale=3] at (1,1) {dfr};		
		
<pre>[scale=3]</pre>	<pre>[scale=3,rotate=45]</pre>	<pre>[scale=3,red]</pre>

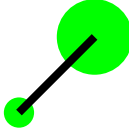
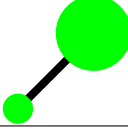
<pre>\tikz [scale=4] \pic at (0,0) {dfr}; \pic at (.5,0) [transform shape] {dfr};</pre>	
---	--

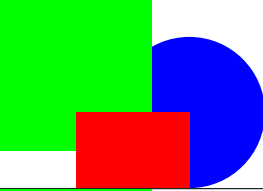
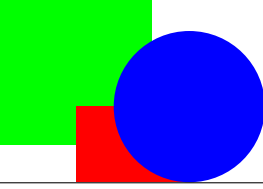
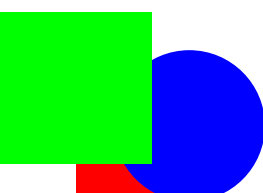
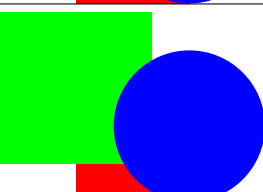
On a path
<pre>\tikz \draw (0,0) to [out=10,in=170] pic [near start] {dfr} pic {dfr} pic [sloped, near end] {dfr} (10,0);</pre>

<pre>\draw (0,0) to [out=10,in=170] pic [pos=.3] {code={\draw circle [radius=3mm];}} (10,0) ;</pre>


Définition :				
<code>\tikzset{ my pic/.pic = {</code> <code>\path [pic actions] (0,0) circle[radius=3mm];</code> <code>\draw (-3mm,-3mm) rectangle (3mm,3mm); } }</code>				
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>


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



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

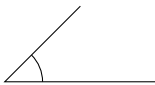
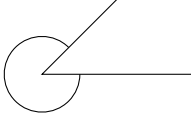
<code>\fill [green](-1,0) -- (1,0)</code> <code>pic [pics/background code={\fill[blue] (0.5,0.5) circle (1cm)};</code> <code>, pics/code=\fill[red] (-1,-.5) rectangle (0.5,0.5);]</code> <code>{ } -- (1,2) -- (-1,2) -- cycle ;</code>	
<code>\fill [green] (-1,0) -- (1,0)</code> <code>pic [pics/foreground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

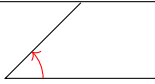
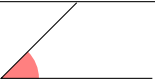
4.2 Angles marking



PGFmanual section : 39

Load package : `\usetikzlibrary{angles}`

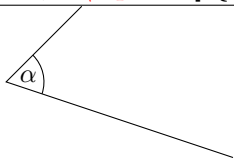
<code>\tikz \draw (2,0) coordinate (A) - - (0,0) coordinate (B)</code> <code>- - (1,1) coordinate (C) pic [draw] {angle};</code>	
	
<code>pic [draw] {angle}</code>	<code>pic [fill] {angle}</code>

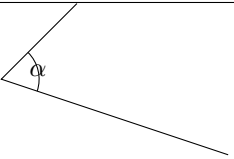
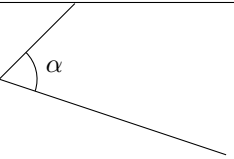
<code>\tikz \draw (2,0) coordinate (X) - - (0,0) coordinate (Y)</code> <code>- - (1,1) coordinate (Z) pic [draw] {angle= X-Y-Z};</code>	
	
<code>pic [draw] {angle= X-Y-Z}</code>	<code>pic [fill] {angle = Z-Y-X}</code>
By default : angle= A-B-C	

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

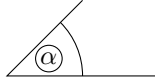
<code>\tikz \draw (2,0) coordinate (A) - - (0,0) coordinate (B)</code> <code>- - (1,1) coordinate (C) pic [draw,angle radius=1cm] {angle};</code>	
	
<code>pic [draw,angle radius=1cm] {angle}</code>	<code>pic [fill,angle radius=1cm] {angle}</code>
By default : angle radius=5mm	

Load package : `\usetikzlibrary{quotes}`

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

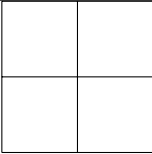
<code>\tikz \draw (3,0) coordinate (A) - (0,1) coordinate (B) - (1,2) coordinate (C)</code> <code>pic [draw,"\$\alpha\$", angle eccentricity=1] {angle};</code>	
	
<code>angle eccentricity=1</code>	<code>angle eccentricity=1.5</code>
By default : angle eccentricity= 0.6	

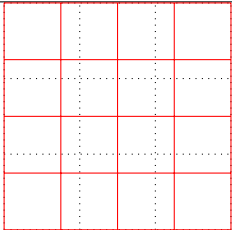
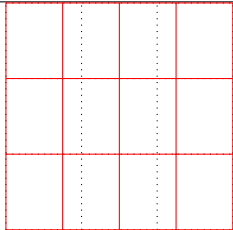
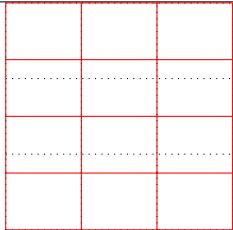
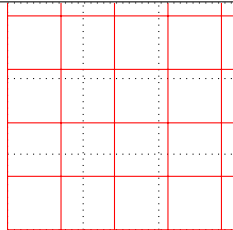
```
\tikz \draw (3,0) coordinate (A) -- (0,1) coordinate (B) -- (1,2) coordinate (C)
pic (xxx) [draw,"$\alpha$ ",angle radius= 1cm ] {angle};
\draw (xxx) circle [radius=5pt];
```

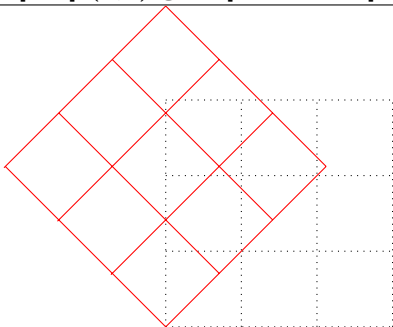
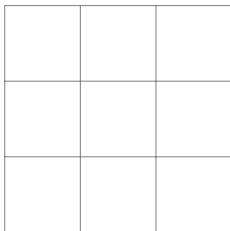


5 coordinates

5.1 Grid

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

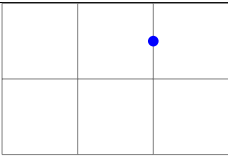
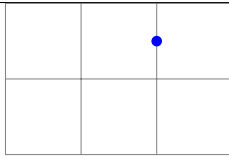
<code>\draw (0,0) grid [step=.75cm] (0,0) grid (3,3);</code>			
			
step=.75cm	x step=.75cm	ystep=.75cm	step=(45:1)

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

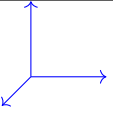
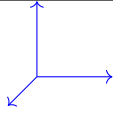
5.2 Coordinates

PGFmanual section : 13-2-1

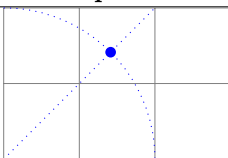
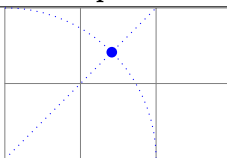
5.2.1 Canvas coordinates

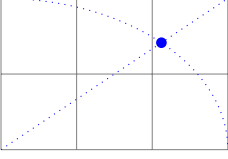
Explicite	Implicite
	
<code>\fill (canvas cs:x=2cm,y=1.5cm) circle (2pt);</code>	<code>\fill (2cm,1.5cm) circle (2pt);</code>

5.2.2 xyz coordinates

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

5.2.3 Polar coordinates

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>

5.2.4 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>

5.2.5 Barycentric coordinates

[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

5.2.6 Names coordinates: nodes

[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 85

5.2.7 Coordinates relative to a node

<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

5.2.8 Coordinates relative to two points

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

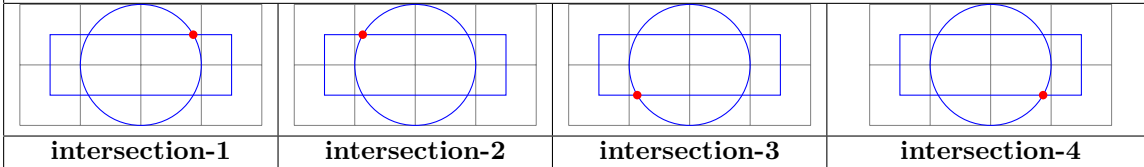
<pre>\node [circle,fill=red!20] at (1,1 - 3,3) {X}</pre>	
at (1,1 - 3,3)	at (1,1 - 3,3)

5.2.9 Coordinates relative to an intersection

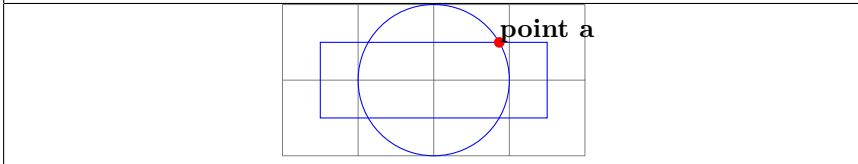
[PGFmanual section : 13-3-2](#)

Load package : `\usetikzlibrary{intersections}`

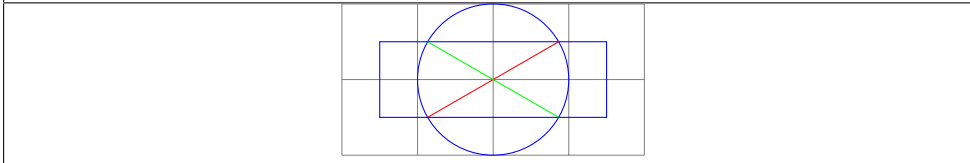
```
\draw [name path=cercle] (2,1) circle (1cm);
\draw [name path=rectangle] (0.5,0.5) rectangle +(3,1);
\fill [red,name intersections={of=cercle and rectangle}] (intersection-1) circle (2pt)
```



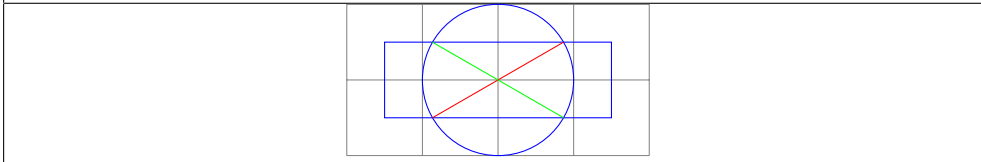
```
\fill [red, name intersections={of=cercle and rectangle}]
(intersection-1) circle (2pt) node[black,above right] {point a};
```



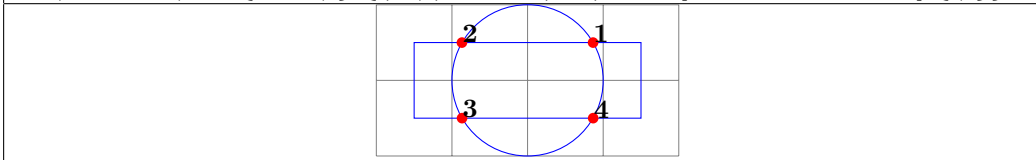
```
\fill [red, name intersections={of=cercle and rectangle, name=point}];
\draw [red] (point-1) -- (point-3); \draw [green] (point-2) -- (point-4);
```



```
\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}}
```

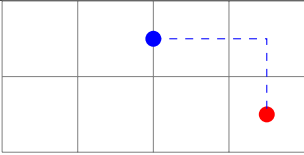


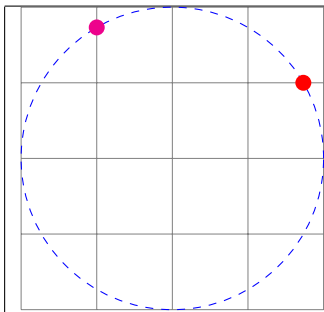
5.3 Calculated position

5.3.1 Calculated position with “pgfmath”

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

Package automatically loaded with Tikz

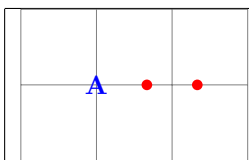

<i>Explicite</i> : <code>\fill [red] (canvas cs:x=2cm+1.5cm,y=1.5cm-1cm) circle (3pt);</code>
<i>Implicite</i> : <code>\fill [red] (2cm+1.5cm,1.5cm-1cm) circle (3pt);</code>

	<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>
---	---

5.4 Calculated position with “library calc”

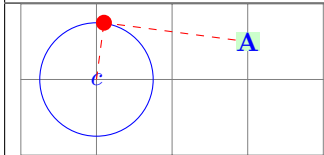
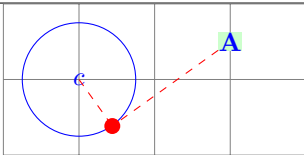
[PGFmanual section : 13-5](#)

Load package : `\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>
---	--

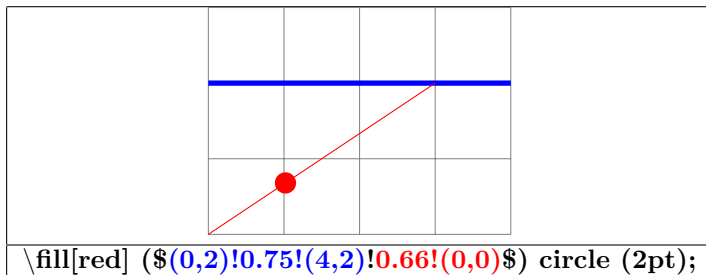
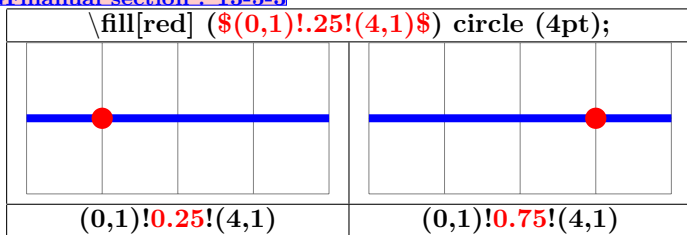
5.5 Tangents with “library calc”

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

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

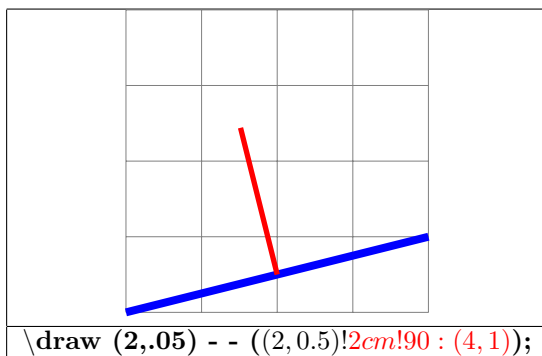
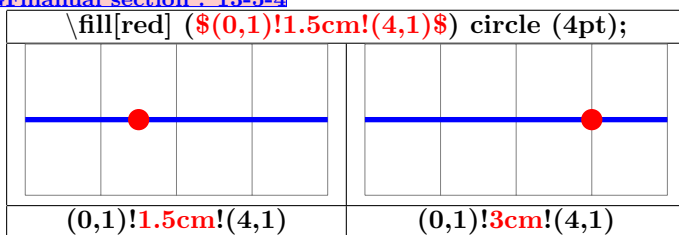
5.5.1 Percentage position

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



5.5.2 Position at a given distance

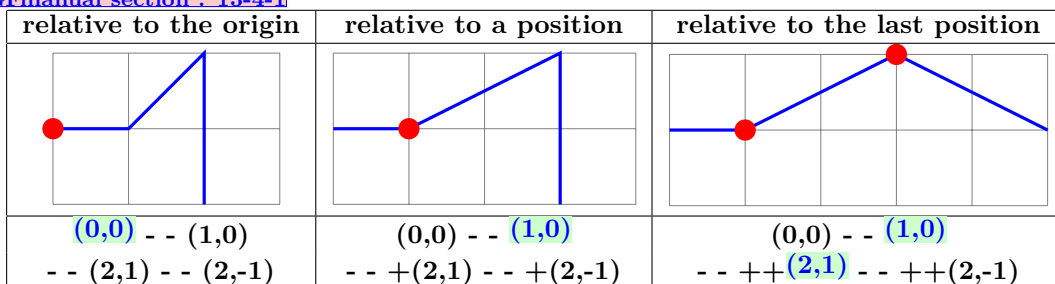
[PGFmanual section : 13-5-4](#)

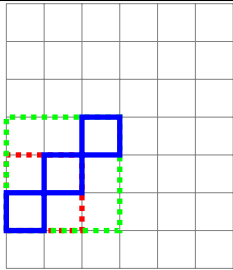
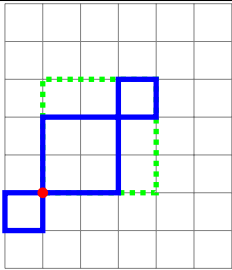
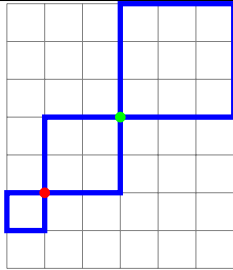


5.5.3 Relative coordinates

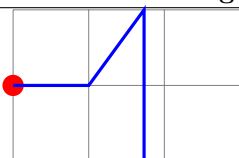
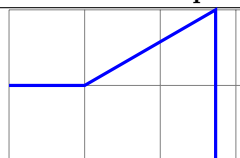
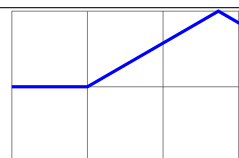
5.5.4 Cartesian coordinates

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



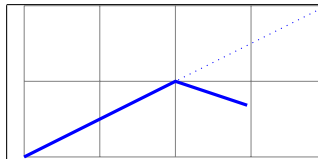
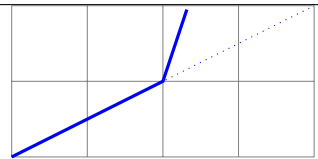
		
<code>\draw (0,0) rectangle (1,1) rectangle (2,2) rectangle (3,3);</code>	<code>\draw (0,0) rectangle (1,1) rectangle +(2,2) rectangle +(3,3);</code>	<code>\draw (0,0) rectangle (1,1) rectangle ++(2,2) rectangle ++(3,3);</code>

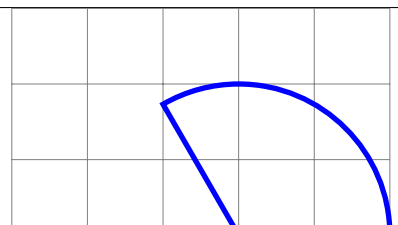
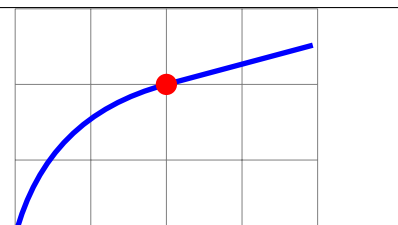
5.5.5 Polar

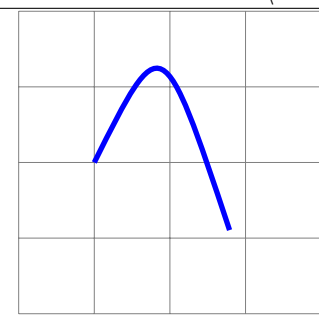
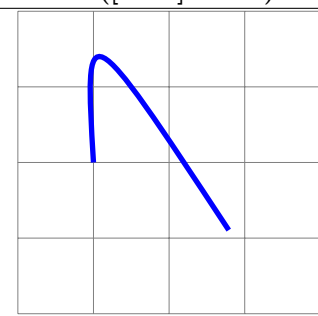
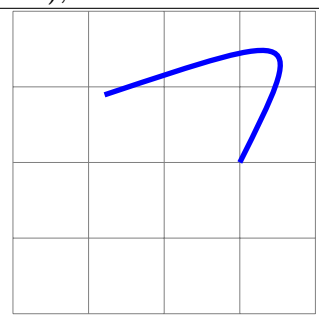
relative to the origin	relative to a position	relative to the last position
		
<code>(0:0) - - (0:1) - - (30:2) - - (-30:2)</code>	<code>(0:0) - - (0:1) - - +(30:2) - - +(-30:2)</code>	<code>(0:0) - - (0:1) - - ++(30:2) - - ++(-30:2)</code>

5.5.6 Relative polar coordinate

[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>

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

6 Nodes

6.1 Creation of nodes

\draw (1,1) node[fill=red!20] {texte};			
By default	node[draw]	node[circle]	node[circle,draw]

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

Other type of nodes see page 70

6.2 Links

(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] (B) at (2,2) {B} \color{red}edge [->] (A);		
[->]	[red]	[dashed]

6.3 Label on node

\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 shorthandoff{ : } ¹ \backslash node [draw, label =right :texte] {} \backslash shorthandon{ : }				
\square texte	texte \square	texte \square	\square texte	\square texte
label=right	label=left	label=above	label=below	label=45

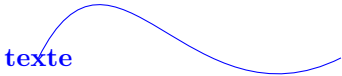

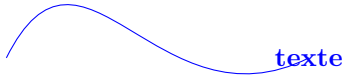
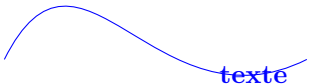
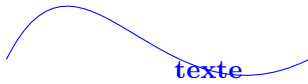

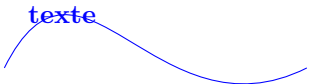

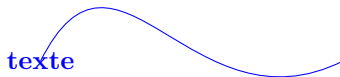
\backslash fill(0,0) circle (2pt) node[below right=.3cm,draw, label=45 :étiquette] {texte} ;




\backslash shorthandoff{ : } \backslash node[circle,draw,blue, pin =texte] {} ; \backslash shorthandon{ : } ¹		
[circle,pin=texte]	[circle,pin=60 :texte]	[circle,pin=right :texte]




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

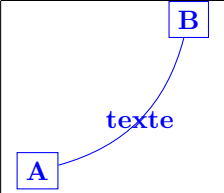
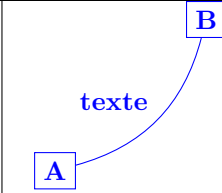
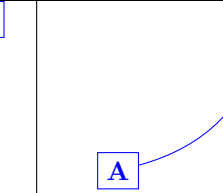
¹désactivation et ré-activation de « : »conflict entre les modules Tikz et Babel en français

6.4 Nodes on path

\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)

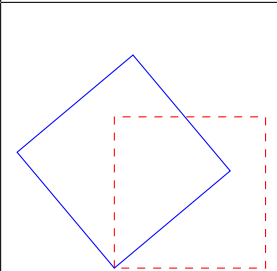
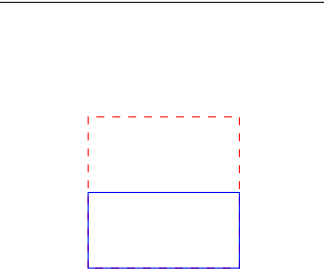
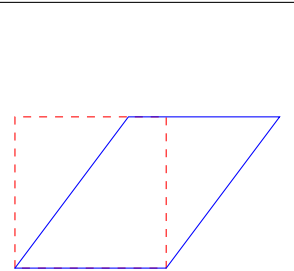
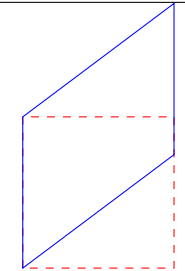
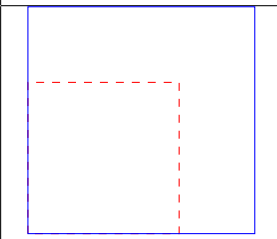
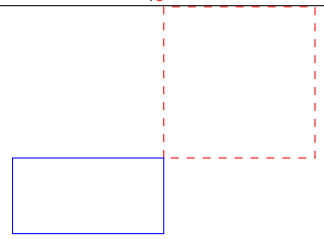
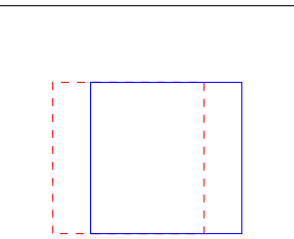
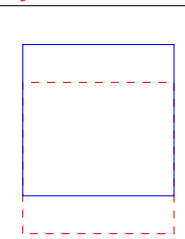
\draw(0,0) .. controls (1,2) and (2,1) .. (4,0) node[sloped,midway] {texte} ;		
		
sloped	above	below

\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 Transformations

PGFmanual section : 25-3

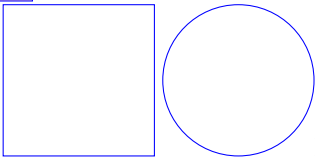
\draw[rotate,blue] (0,0) rectangle (2,2) ;			
			
rotate=40	x=1cm,y=0.5cm	xslant=0.75	yslant=0.75
			
scale=1.5	scale=-1	xshift=0.5cm	yshift=0.5cm

8 Placing the picture

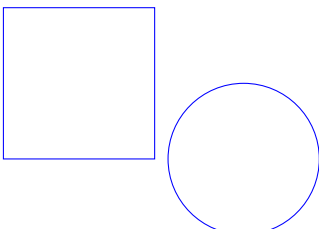
8.1 In the text

8.1.1 Without offset

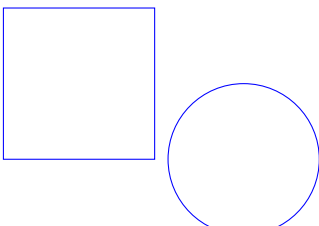
PGFmanual section : 12-2

picture in the text  here is the following code : `\tikz \Draw (0,0) rectangle(2,2);\tikz \Draw (0,0) circle (1);`

8.1.2 With zero offset

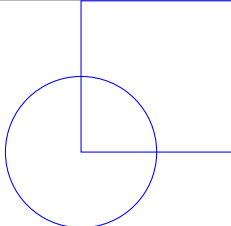
picture in the text  here is the following code : `\tikz[baseline=0pt] \Draw (0,0) rectangle(2,2);\tikz[baseline=0pt] \Draw (0,0) circle (1);`

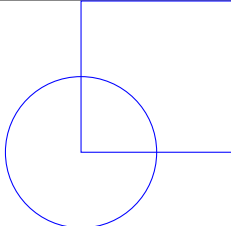
8.1.3 With an offset

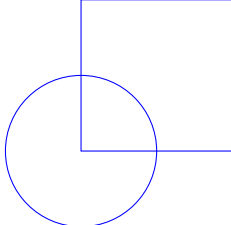
picture in the text  here is the following code : `\tikz[baseline=1cm] \Draw (0,0) rectangle(2,2);\tikz[baseline=1cm] \Draw (0,0) circle (1);`

8.2 In a tikzpicture environment

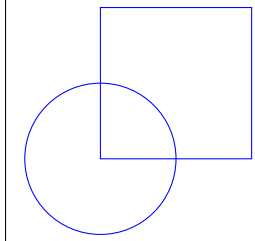
PGFmanual section : 12-1

 <p>text before</p> <p>text after</p>	<pre> text before \begin{tikzpicture}[blue] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} text after </pre>
--	---



 <p>text before</p> <p>text after</p>	<pre> text before \begin{tikzpicture}[blue,baseline=0pt] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} text after </pre>
--	--

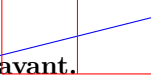
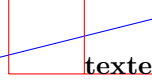
 <p>text before</p> <p>text after</p>	<pre> text before \begin{tikzpicture}[blue,baseline=1cm] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} text after </pre>
---	--

8.3 In a fbox environment

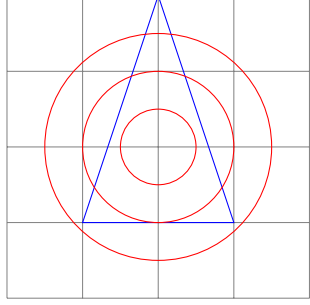
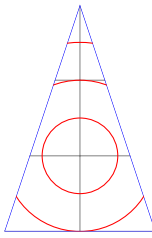
 <p>text before</p> <p>text after</p>	<pre> text before \fbbox{ \begin{tikzpicture}[blue,baseline=0pt] \draw (0,0) rectangle(2,2); \draw (0,0) circle (1); \end{tikzpicture} } text after </pre>
--	--

8.4 Bounding box

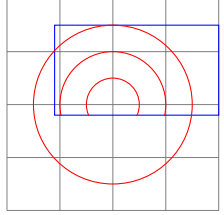
<pre> \draw [use as bounding box] (1,0) rectangle (2,1); \draw[blue] (-1,0) - - (3,1); </pre>	
 <p>texte avant</p> <p>texte après</p>	 <p>texte avant</p> <p>texte après</p>
<p>(1,0) rectangle (2,1)</p>	<p>(0,0) rectangle (0,0)</p>

<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>	
	
[trim left=1cm]	[trim right= 1cm]

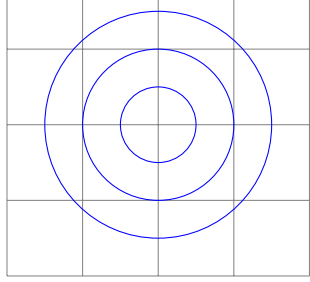
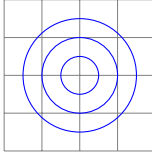
8.5 Clipping the picture

	
no clipping	\clip (-1,-1) - - (0,2) - - (1,-1) - - cycle;

8.6 Partial clipping

	<pre> \tikzpicture[red,scale=.7] \draw[help lines] (-2,-2) grid (2,2); \draw[blue] (-1.1,-0.2) rectangle (2,1.5); \draw (0,0) circle (1.5); \clip (-1.1,-0.2) rectangle (2,1.5); \draw (0,0) circle (.5); \draw (0,0) circle (1); \endtikzpicture </pre>
--	--

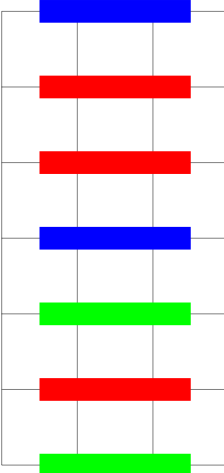
8.6.1 Scaling

	
Normal size	\tikzpicture[blue,scale=.5]

9 Scope

9.1 Environnement Scope

PGFmanual section : 12-3

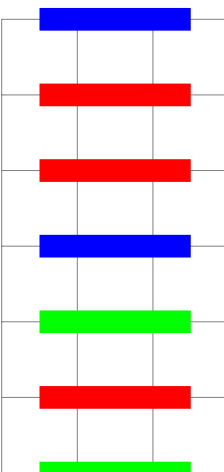
<pre> \begin{tikzpicture}[line width = 3mm] \draw (0.5,6) - - (2.5,6); \begin{scope}[red] \draw (0.5,5) - - (2.5,5); \draw (0.5,4) - - (2.5,4); \end{scope} \draw (0.5,3) - - (2.5,3); \begin{scope}[green] \draw (0.5,2) - - (2.5,2); \draw [red] (0.5,1) - - (2.5,1); \draw (0.5,0) - - (2.5,0); \end{scope}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

9.2 library scopes

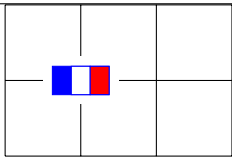
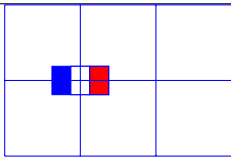
9.2.1 [

Shorthand for Scope Environments] PGFmanual section : 12-3-2

Load package : \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>	
--	--

9.2.2 Single Command Scopes

		à
<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

10 Absolute position on a 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

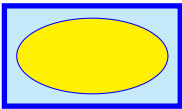
south west

south

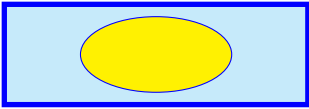
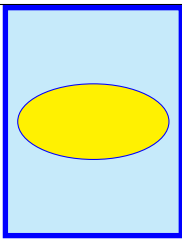
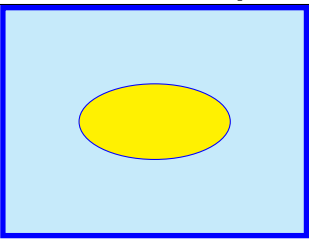

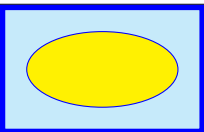
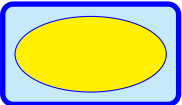
south east

11 Background

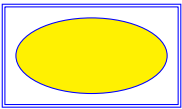
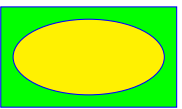
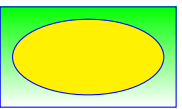
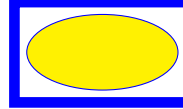
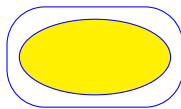
11.1 Framing

	¹ <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>
---	---

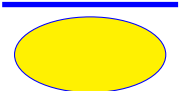
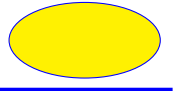
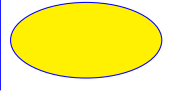
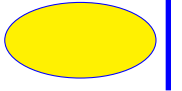
11.1.1 Options

\begin{tikzpicture}[show background rectangle,inner frame xsep=1cm]		
		
inner frame xsep=1cm	inner frame ysep=1cm	inner frame sep=1cm
By default: inner frame xsep=1ex et inner frame ysep=1ex		
		
tight background	loose background	rounded corners
(inner frame sep = 0pt)	(inner frame sep = 2ex)	

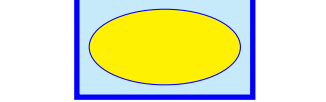
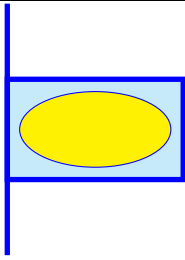
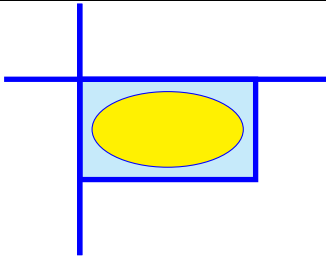
11.1.2 Style

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

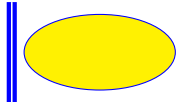
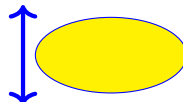
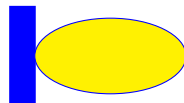
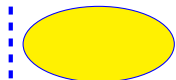
11.2 Partial framing

\begin{tikzpicture}[show background top]			
			
show background top	show background bottom	show background left	show background right

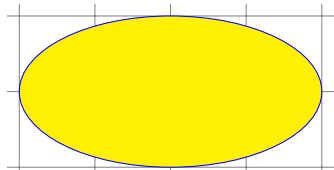
¹\tikzset{background rectangle/.style={fill=cyan!20,draw=blue,line width=2pt}}

<code>\begin{tikzpicture}[framed,show background top,outer frame xsep=1cm]</code>		
		
<code>outer frame xsep=1cm</code>	<code>outer frame ysep=1cm</code>	<code>outer frame sep=1cm</code>

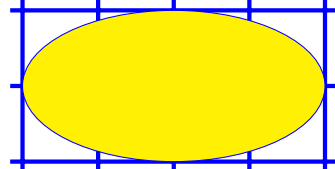
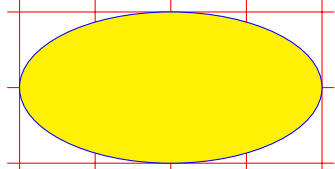
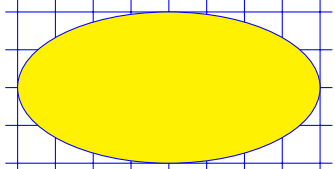
11.2.1 Style

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

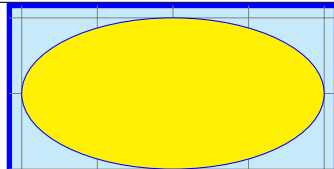
11.2.2 Gridding

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

11.2.3 Style













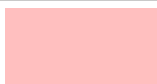






<code>\begin{tikzpicture}[background grid/.style={ultra thick,draw=blue},show background grid]</code>		
		
<code>ultra thick ,draw=blue,draw=blue</code>	<code>draw=red</code>	<code>step=.5cm,draw=blue</code>

11.2.4 Framing and gridding

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





12 Own colors

12.1 Basic colors

				
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]


12.2 Colors mixing

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



12.3 Naming a color

[PGFmanual section : 15-2](#)

12.3.1 Percentage of red , green and blue

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

12.3.2 From existing color

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

13 Opacity

[PGFmanual section : 23-2](#)

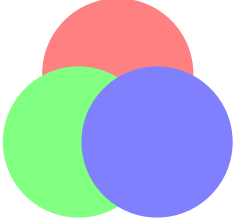
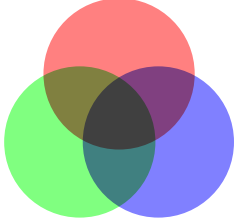
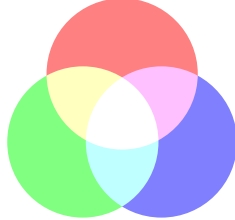

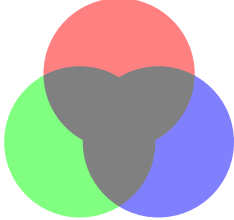

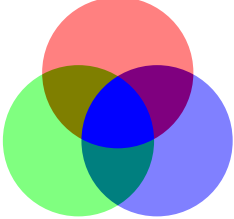

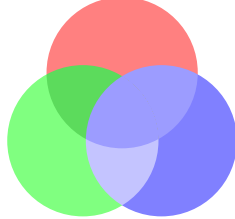
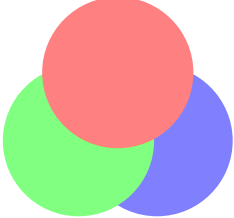
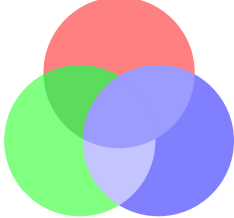
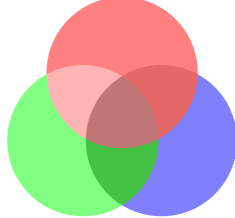
\draw[red] (0,0) – (2,1); \draw [blue,draw opacity=0] (0,1) - - (2,0);				
draw opacity=0	draw opacity=0.25	draw opacity=0.5	draw opacity=0.75	draw opacity=1

\fill[red] (0,0) rectangle (1,1); \fill[blue,transparent] (0.5,0) rectangle (1.5,1);				
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	

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

13.1 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




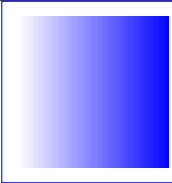
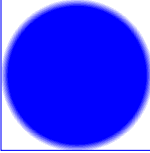
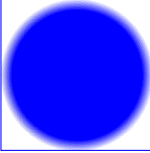

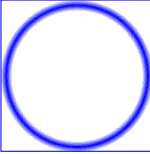
A revoir message d'erreur Unknow blend mode			
blend group=colordodge	blend group=colorburn	blend group=hardlight	blend group=softlight

13.2 Fading

Load package : `\usetikzlibrary{fadings}`

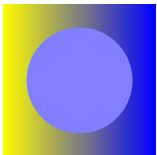

13.2.1 Preset pattern

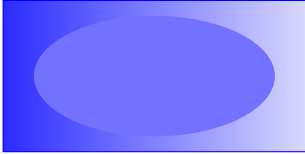

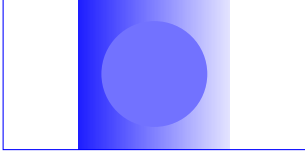





PGFmanual section : 51

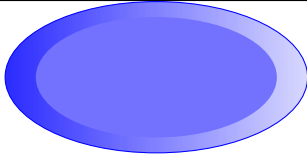
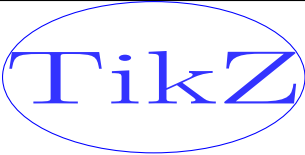
<code>\fill [blue,path fading=north] (-1,-1) rectangle (1,1);</code>			
			
path fading=north	path fading=south	path fading=east	path fading=west
			
path fading=circle with fuzzy edge 10 percent		path fading=circle with fuzzy edge 15 percent	
			
path fading=circle with fuzzy edge 20 percent		path fading=fuzzy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

13.2.2 Own pattern of fading with 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>	

Utilization in a frame	
<code>\fill[path fading=filtre] (-2,-1) rectangle (2,1);</code>	
	
<code>[path fading=filtre]</code>	<code>[path fading=tikz]</code>
	
<code>[path fading=filtre ,fit fading=false]</code>	<code>[path fading=tikz,fit fading=false]</code>
	
<code>left color=blue,right color=red</code>	<code>[path left color=blue,right color=red]</code>
	
<code>[path fading=filtre ,red]</code>	<code>[path fading=tikz,red]</code>

Utilization in an ellipse	
<code>\fill[path fading=filtre] (-2,-1) ellipse (2 and 1);</code>	
	
<code>[path fading=filtre]</code>	<code>[path fading=tikz]</code>

13.3 Own fading with 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>	

13.3.1 Modification of the fading

PGFmanual section : 23-4-2

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

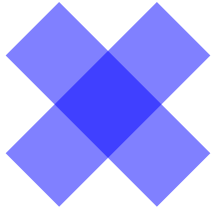
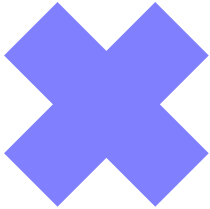
PGFmanual section : 23-4-3


<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>	<pre>VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ VisualTIKZ</pre>
--	---

13.4 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>	

14 Create command

Load package : **Warning: the creation of the command must be placed before `\begin{document}` !**

syntax : `\newcommand{\name}[number of variables]{Description}`

Example : command with one variable :

Creation

```
\newcommand
{\maboite}[1]{          % command named "maboite" with one variable
\begin{center}          % centering the box
\tikzpicture \node[fill=yellow] % a yellow text box
, text centered          % centering the text in the box
, text width=.5\linewidth % to set the width of the box
#1 ; \end{center}        % #1 will be replaced by the variable
}
```

Utilisation : `\maboite{contenu}`

Load package : contenu

Example : command without variable :

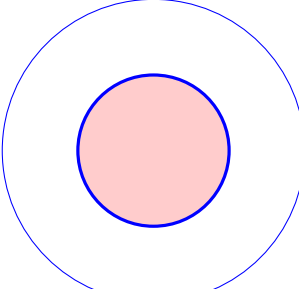
creation

```
\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` 


15 Own style

15.1 Style without 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>
---	---

15.2 Style with 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>
---	---

With a default value	
	<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>

16 Text highlighting

16.1 In a TikZ node

\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]

16.1.1 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
By default : 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
By default : 0.5\pgflinewidth			

16.1.2 Minimum size

\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

16.2 Geometric Shapes nodes

Load package : `\usetikzlibrary{shapes.geometric}`

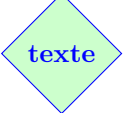
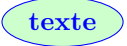


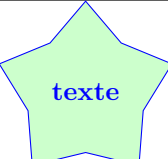
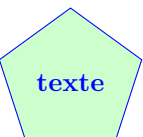
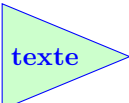
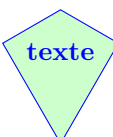
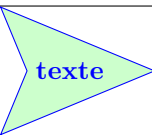
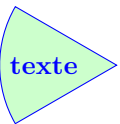

PGFmanual section : 67-3

16.2.1 Available shapes

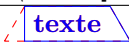


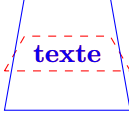

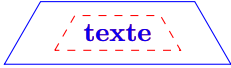
2 syntaxes :

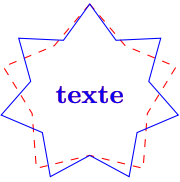
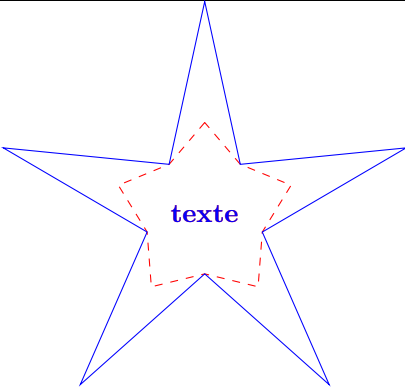
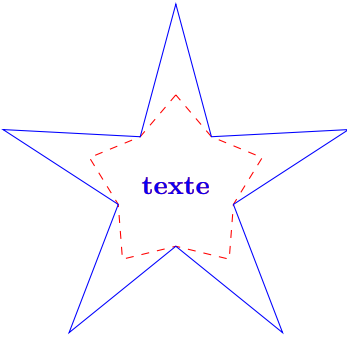
`\tikz \node[fill=green!20,shape=diamond,draw,blue] {texte};`

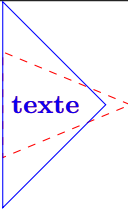
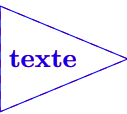
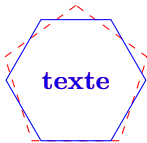
`\tikz \node[fill=green!20,diamond,draw] {texte};`

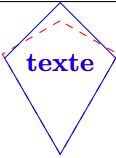
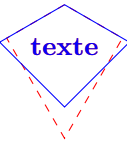
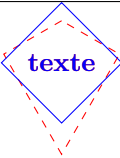
			
diamond	ellipse	trapezium	semicircle
			
star	regular polygon	isosceles triangle	kite
			
dart	circular sector	cylinder	

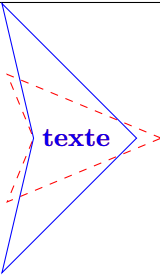
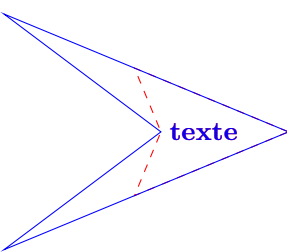
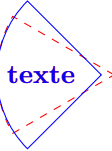
16.2.2 Options





<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





\tikz \node [fill=green!20,star,star points=6,draw] {texte};		
		
star points=7	star point height = 2cm	star point ratio = 3
By default5	By default.5cm	By default1.5

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

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

\node [dart,dart tip angle=90,draw,blue] {texte};		
		
dart tip angle=90	dart tail angle=90	circular sector angle=90
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


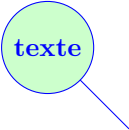




\draw(0,0) node[shape aspect=1,diamond,draw] {texte} ;			
			
shape aspect=1	shape aspect=2	shape aspect=3	shape aspect=4

16.3 Symbol Shapes nodes

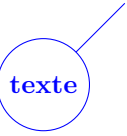
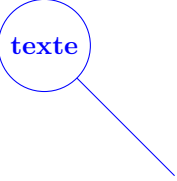

Load package : `\usetikzlibrary{shapes.symbols}`

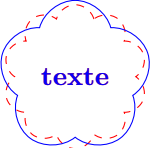
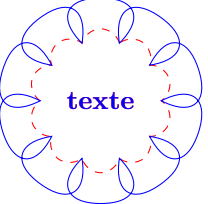


PGFmanual section : 67-4

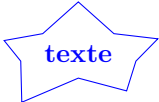
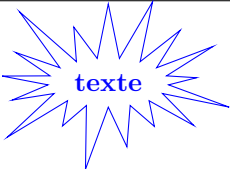


16.3.1 Available shapes




		
forbidden sign	magnifying glass	cloud
		
starburst	signal	tape





16.3.2 Options





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


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







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

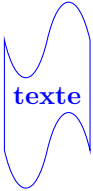
\node [signal,signal pointer angle=45,draw,blue] {texte};		
		
signal pointer angle=45	signal pointer angle=10	signal pointer angle=300
By default : signal pointer angle= 90		

\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 (By default)



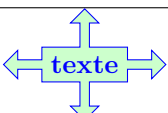
\tikz \node [tape, draw, tape bend height=1cm,blue] {texte};

By default : tape bend height = 5pt

16.4 Arrow Shapes nodes

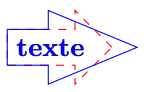
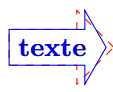
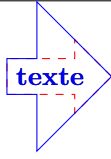
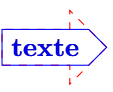
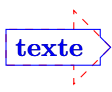
Load package : `\usetikzlibrary{shapes.arrows}`

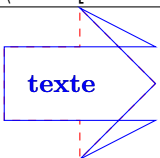
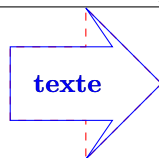
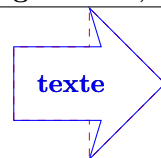
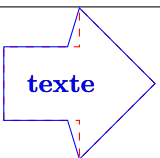
PGFmanual section : 67-5

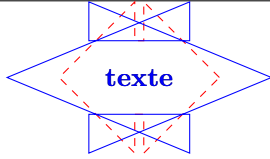
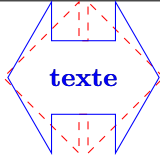
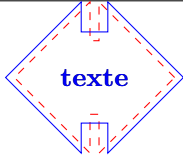
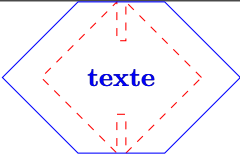
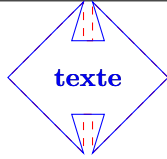
16.4.1 Available shapes

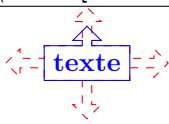
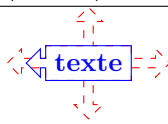
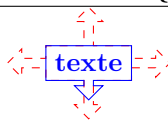
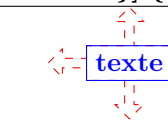
		
single arrow	double arrow	arrow box

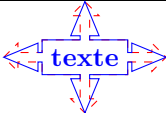
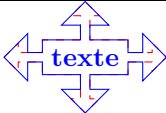
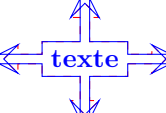
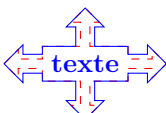
16.4.2 Options

<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
By default: single arrow tip angle= 90		By default: 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}
By default : 0.5 cm			




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

16.5 Callout Shapes nodes

Load package : `\usetikzlibrary{shapes.callouts}`

PGFmanual section : 67-7

16.5.1 Available shapes







		
ellipse callout	rectangle callout	cloud callout

16.5.2 Options

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

<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>
By default : <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
By default : callout pointer start size =.2 of callout		
		
callout pointer end size=.5	callout pointer end size=.8cm	callout pointer segments=3
By default : callout pointer start size = .1 of callout		By default : segments=2

16.6 Miscellaneous Shapes nodes

Load package : `\usetikzlibrary{shapes.misc}`






PGFmanual section : 67-8





16.6.1 Available shapes




			
cross out	strike out	rounded rectangle	chamfered rectangle

16.6.2 Options





Options pour “rounded rectangle” :




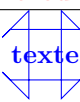

\node [draw, rounded rectangle,rounded rectangle arc length=270] {texte};				
				
270	180	120	90	45






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




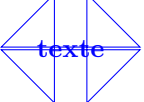
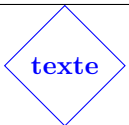
\node [draw, rounded rectangle,rounded rectangle east arc=concave] {texte}; \node [draw, rounded rectangle,rounded rectangle right arc=concave] {texte};				
				
concave	convex			none




Options pour “chamfered rectangle” :

\node [draw, chamfered rectangle,chamfered rectangle angle=30] {texte};				
				
10	30	60		80
By default: 45				

\node [draw, chamfered rectangle,chamfered rectangle xsep=10pt] {texte};				
				
xsep=0pt	xsep=5pt	xsep=10pt	xsep=-10pt	xsep=2cm
By default: 0.666ex				

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

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

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

16.7 Shapes with Multiple Text Parts

Load package : `\usetikzlibrary{shapes.multipart}`

PGFmanual section : 67-6


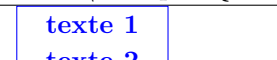
```
\node [circle split,draw,fill=green!20]{haut \nodepart{lower} bas };
```



circle split	circle solidus	ellipse split	rectangle split




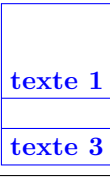
	<pre>\node[rectangle split,rectangle split parts=5,draw] {texte 1 \nodepart{second} texte 2 \nodepart{four} texte 3};</pre> <p>By default: rectangle split parts=4</p>
--	--

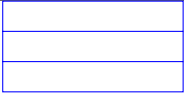

<pre>\node [rectangle split,rectangle split parts=3,rectangle split horizontal,draw,blue] {texte1\nodepart{two}texte2\nodepart{three}texte3};</pre>


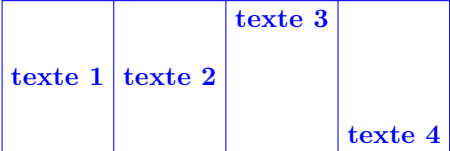
	<pre>\node[rectangle split,rectangle split parts=5,draw] {texte 1 \nodepart{second} texte 2a \\texte 2b \\ texte 2c \nodepart{three} texte 3a \\ texte 3b };</pre>
--	--

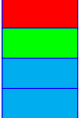
<pre>\node[rectangle split, draw,blue,minimum size = 2cm,rectangle split draw splits= true] {texte 1 \nodepart{two} texte 2 \nodepart{three} texte 3 \nodepart{four} texte 4};</pre>	
	
rectangle split draw splits= true By default	rectangle split draw splits= false

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

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

<pre>\node [rectangle split,rectangle split parts=3,draw,rectangle split empty part width=1cm] {};</pre>	
	
rectangle split empty part width=2cm	By default: 1ex

	<pre>\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};</pre>
	<pre>\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};</pre>

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

16.8 Text attributes

16.8.1 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

16.8.2 Color and font

Texte.	<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]

16.8.3 Font size

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

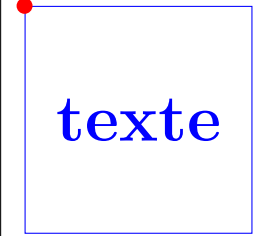
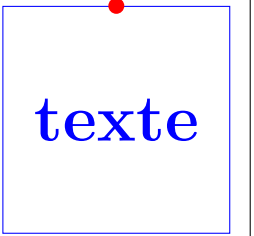
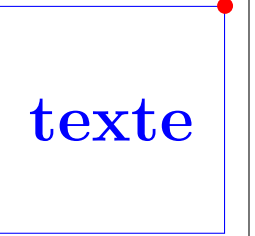
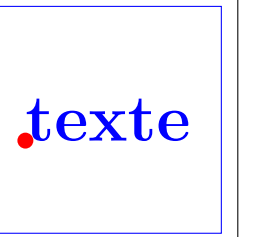
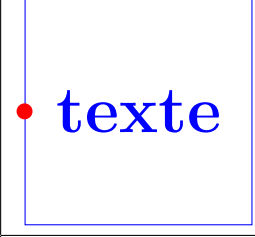
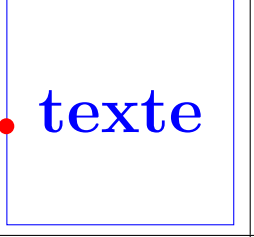
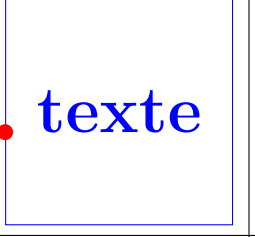
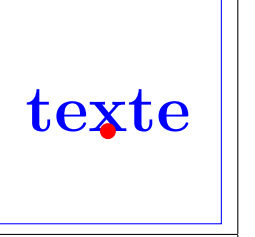
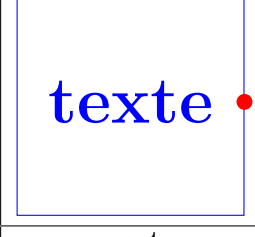
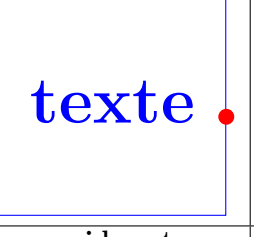
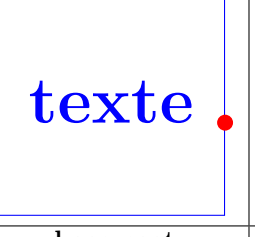
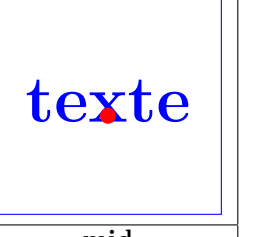
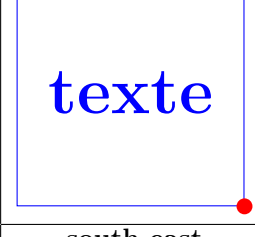
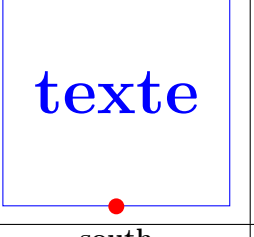
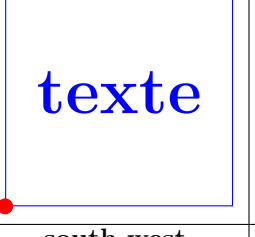
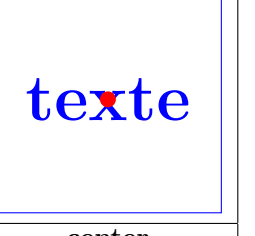
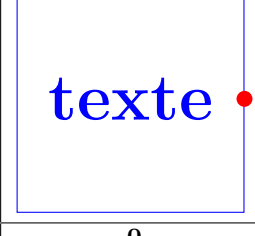
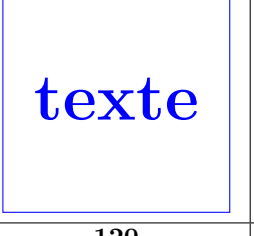
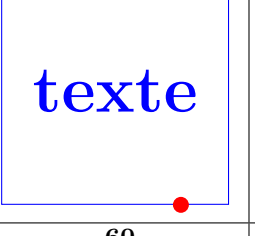
PGFmanual section : 17-4-4

text height=1cm	text depth=1cm

16.9 Positions on a node

16.9.1 For all type of node

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	

16.9.2 Specific to a node

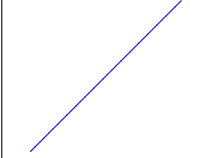
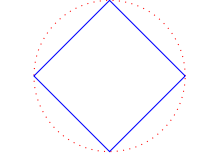
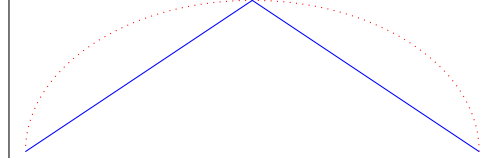
In a future version

17 Décorations

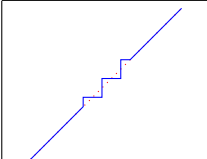
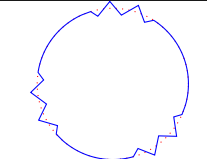
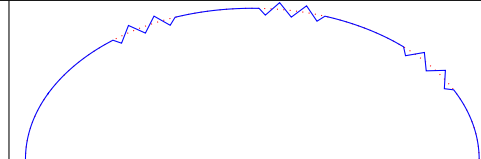
17.1 Library “ decorations.pathmorphing “

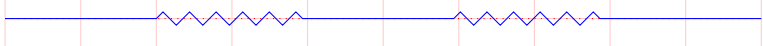
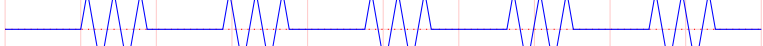
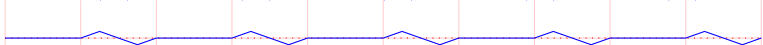
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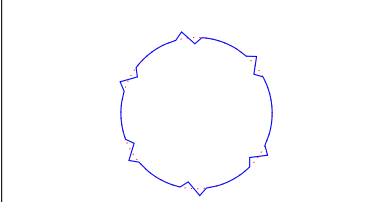
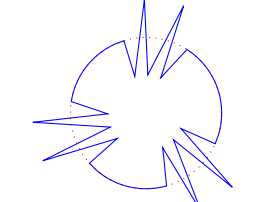
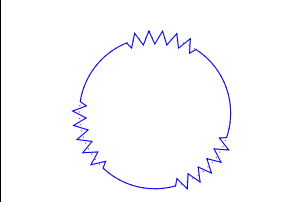
17.1.1 ”lineto “

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

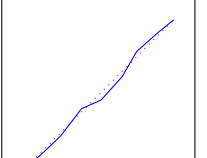
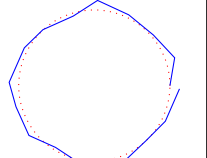
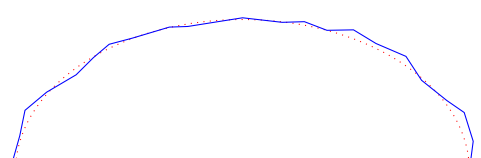
17.1.2 “ straight zigzag “


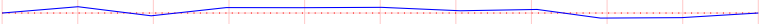
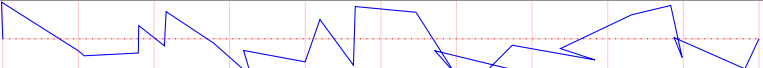
\draw[decorate,decoration=straight zigzag] (0,0) - - (2,2) ;		
		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2);

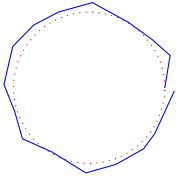
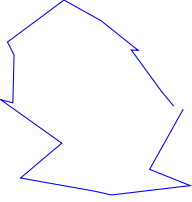
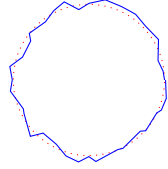
\draw[decorate,decoration={straight zigzag,meta-segment length=2cm}] (0,0) - - (10,0);		By default
meta-segment length=2cm		1cm
amplitude=0.5cm		2.5pt
segment length=1cm		10pt

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

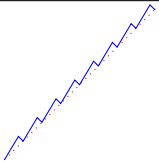
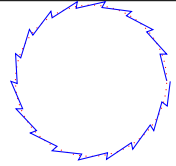
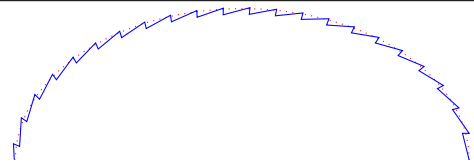
17.1.3 ” random steps “




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

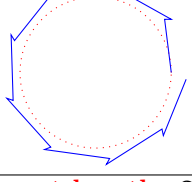
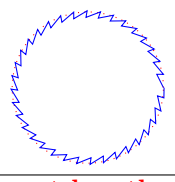
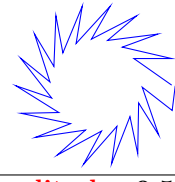
\draw[decorate,decoration={random steps,segment length=2cm}] (0,0) - - (10,0);		By default
segment length=2pt		10pt
segment length=1cm		
amplitude=0.5cm		2.5pt
amplitude=0.5cm, segment length=1cm		

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

17.1.4 "saw" saw

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

\draw[decorate,decoration={saw,meta-segment length=0.5cm}] (0,0) - - (10,0);		By default
segment length=0.5cm		10 pt
segment length=2cm		
amplitude=0.5cm		2.5 pt

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

17.1.5 ” zigzag “

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

\draw[decorate,decoration={zigzag,meta-segment length=2cm}] (0,0) - - (10,0);		By default
segment length=0.5cm		10pt
segment length=2cm		
amplitude=0.5cm		2.5 pt

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

17.1.6 ” bent “

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

\draw[decorate,decoration={bent,amplitude=0.5cm}] (0,0) - - (10,0);		By default
amplitude=0.5cm		2.5 pt
aspect=0.1 (en bleue) aspect=0.9 (en vert) amplitude=0.5cm		0.5

amplitude=1cm	amplitude=0.5cm	aspect=0.25

17.1.7 " bumps "

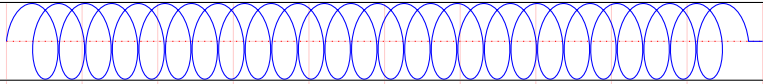
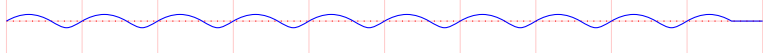
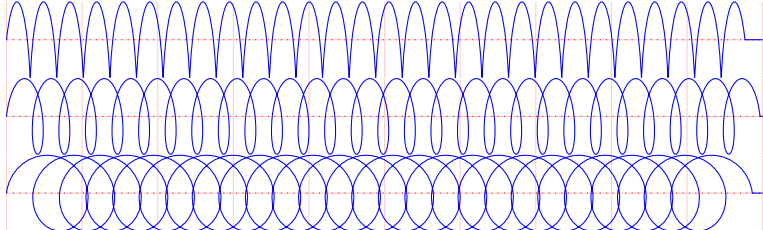
\draw[decorate,decoration=bumps] (0,0) - - (2,2) ;		
(0,0) - - (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

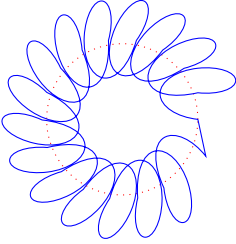
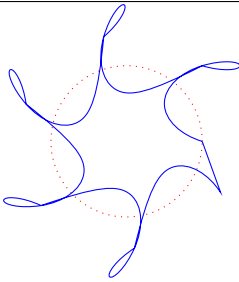
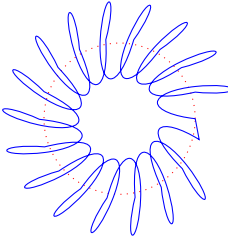
\draw[decorate,decoration={bumps,amplitude=0.5cm}] (0,0) - - (10,0);		By default
amplitude=0.5cm		2.5 pt
segment length=1cm		10 pt

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

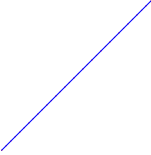
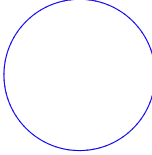
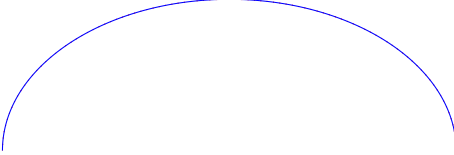
17.1.8 " coil "

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

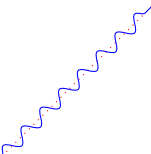
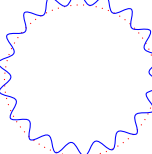
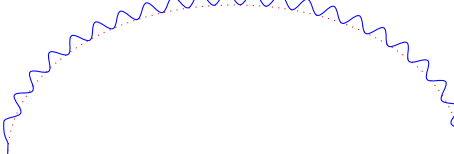
\draw[decorate,decoration={coil,amplitude=0.5cm}] (0,0) - - (10,0);		By default
amplitude=0.5cm		2.5 pt
segment length=1cm		10 pt
aspect=0.1 (amplitude=0.5cm) aspect=0.3 aspect=0.9		0.5

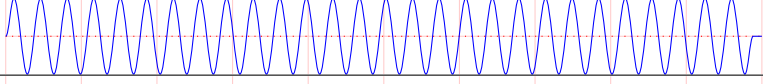
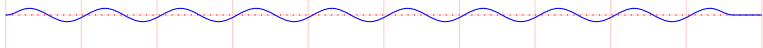
\draw[decorate,decoration={coil,amplitude=0.5cm}] (1,1) circle (1);		
		
amplitude=0.5 cm	segment length=1cm amplitude=0.5cm	aspect=0.25 amplitude=0.5cm

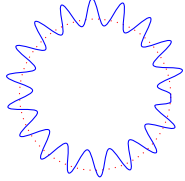
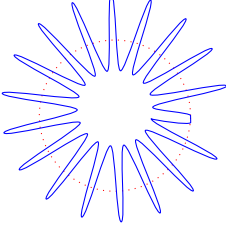
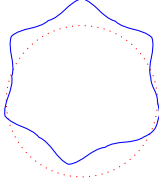
17.1.9 "curveto"

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

17.1.10 "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);		By default
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

17.2 Library “decorations.pathreplacing”

Load package : `\usetikzlibrary{decorations.pathreplacing}`

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17.2.1 ” border “

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

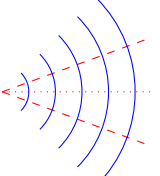
<code>\draw[decorate,decoration={border,amplitude=0.5cm}] (1,1) circle (1);</code>		
amplitude =0.5cm	segment length =1cm , amplitude =0.5cm	angle =90 , amplitude =0.5cm

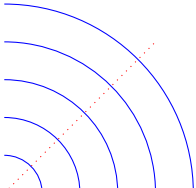
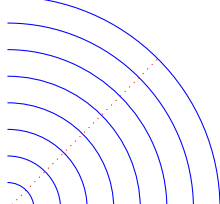
17.2.2 ” brace ”

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

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

17.2.3 "expanding waves"

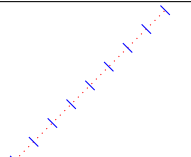
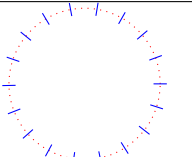
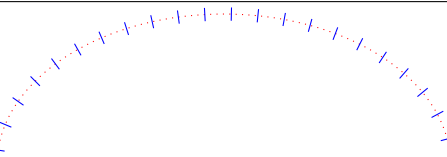
	<pre>\draw[dashed,red](0,0) -- (20:2) ; \draw[dashed,red](0,0) -- (-20:2) ; \draw[decorate,decoration={expanding waves}](0,0) -- (2,0) ;</pre>
---	--

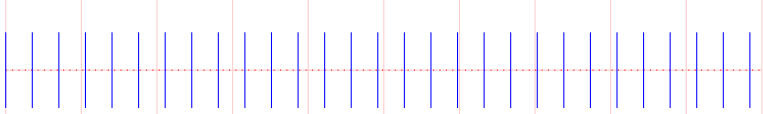
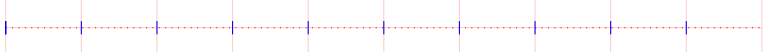
<pre>\draw[decorate,decoration={expanding waves,segment length=0.5cm}](1,1) circle (1);</pre>	
	
segment length=0.5cm	angle=45
By default: 10pt	By default: 20

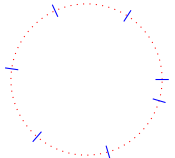
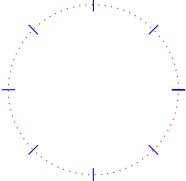
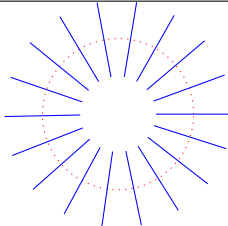
17.2.4 "moveto"

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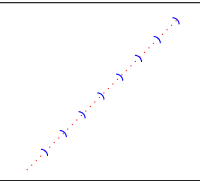
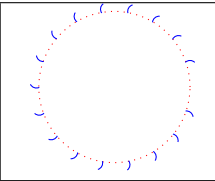
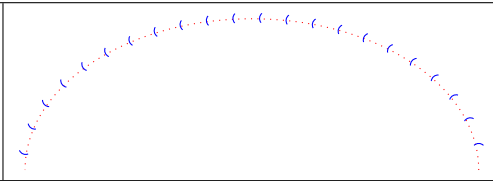
17.2.5 "ticks"

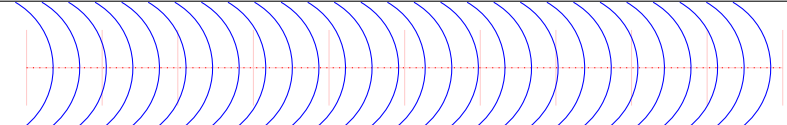
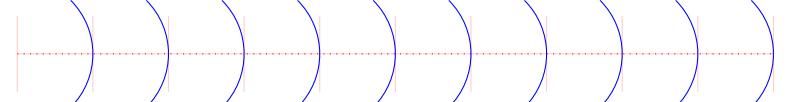
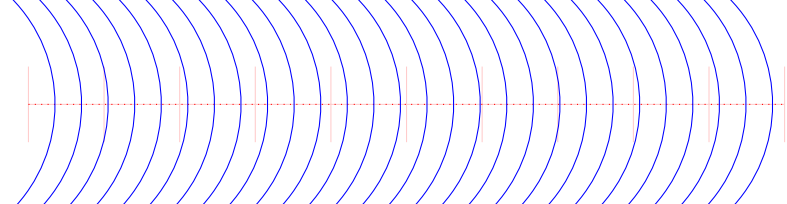
<pre>\draw[decorate,decoration=ticks](0,0) -- (2,2) ;</pre>		
		
(0,0) -- (2,2)	(1,1) circle (1)	(0,0) arc (0:180:3 and 2)

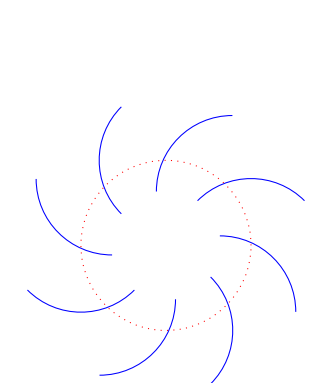
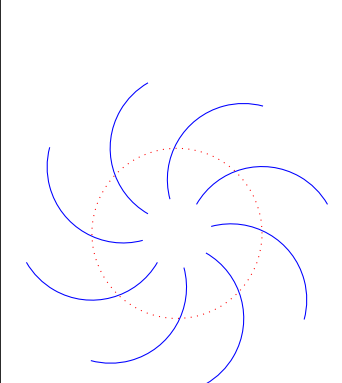
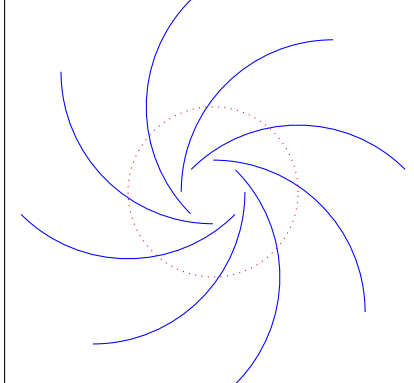
<pre>\draw[decorate,decoration={ticks,amplitude=0.5cm}](0,0) -- (10,0);</pre>		By default
amplitude=0.5cm		2.5 pt
segment length=1cm		10 pt

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

17.2.6 "waves"

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

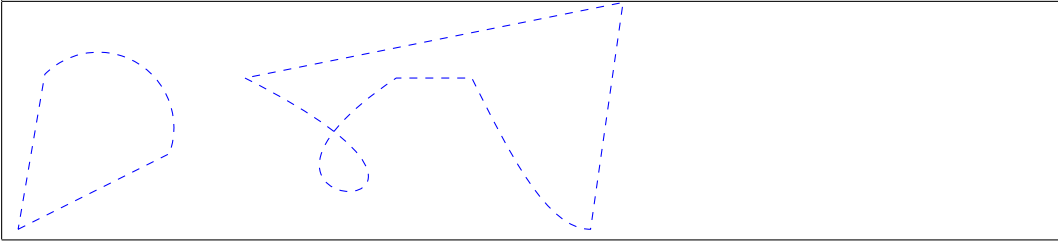
\draw[decorate,decoration={waves,angle=60,radius=1cm}] (0,0) - - (10,0);		By default
angle=60		45
segment length=1cm		10 pt
radius=2cm		10 pt

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

17.2.7 "show path construction"

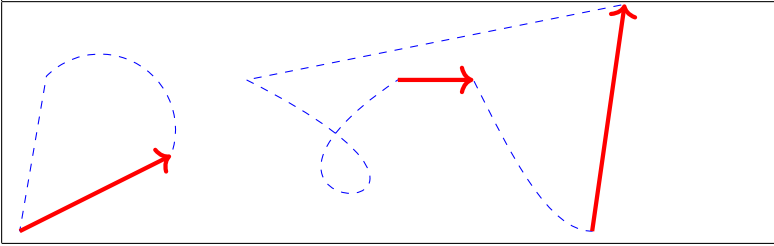
path to decorate

```
\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) - - cycle;
```



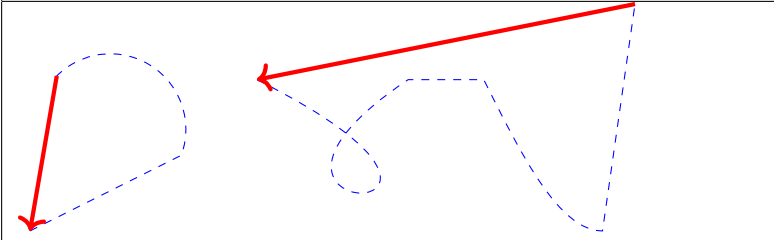
” `lineto` “ :

```
decoration={ show path construction,
lineto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) - - (\tikzinputsegmentlast); },}
```



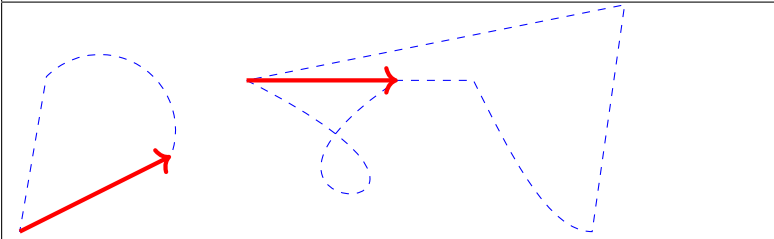
” `closepath` “ :

```
decoration={ show path construction,
closepath code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) - - (\tikzinputsegmentlast); },}
```



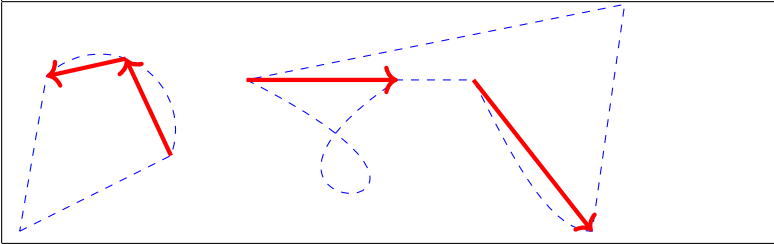
” `moveto code` “ :

```
decoration={ show path construction,
moveto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) - - (\tikzinputsegmentlast); },}
```

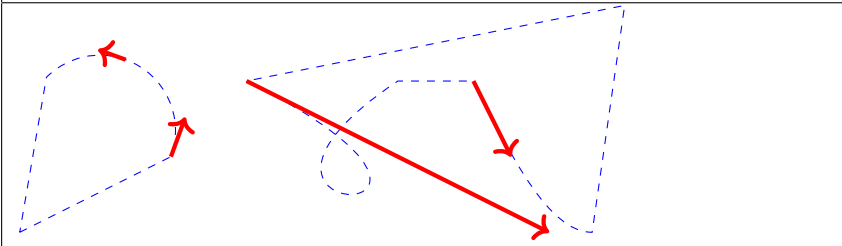


“ curveto “ :

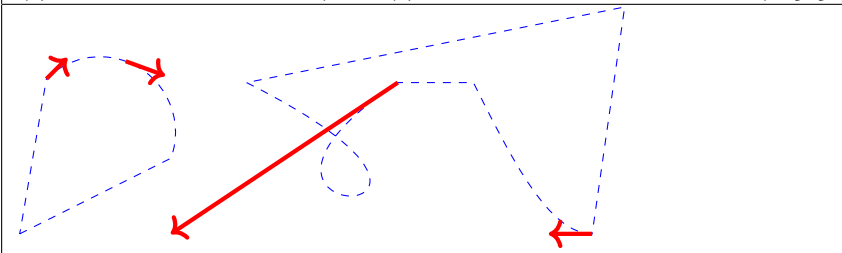
```
decoration={ show path construction,
curveto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) - - (\tikzinputsegmentlast); },}
```



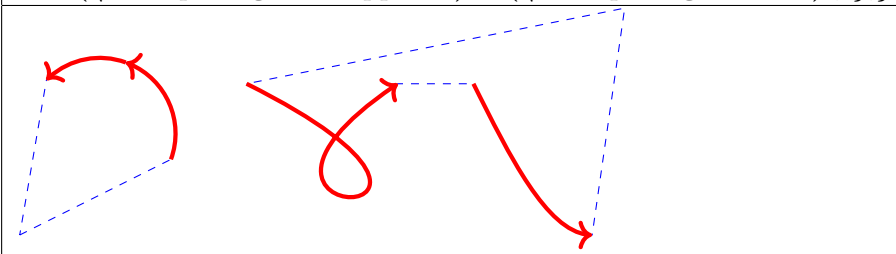
```
decoration={ show path construction,
curveto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) - - (\tikzinputsegmentsupporta); },}
```



```
decoration={ show path construction,
curveto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentlast) - - (\tikzinputsegmentsupportb); },}
```



```
decoration={ show path construction,
curveto code={ \draw [red,ultra thick,->]
(\tikzinputsegmentfirst) .. controls (\tikzinputsegmentsupporta)
and (\tikzinputsegmentsupportb) .. (\tikzinputsegmentlast) ; },}
```



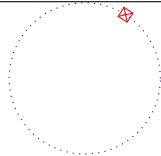
17.3 Library “decorations.markings”

Load package : `\usetikzlibrary{decorations.markings}`

PGFmanual section : 48-4

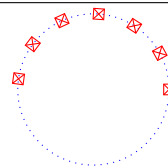
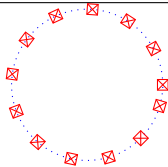
17.3.1 own mark at one position

```
\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);
```



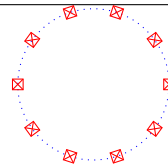
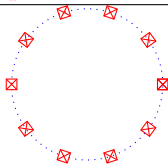
17.3.2 marks between positions and step

```
\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

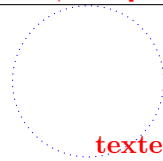
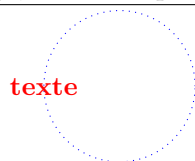
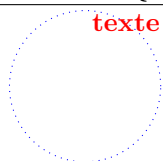


mark= between positions 0 and 1 step 1/10

between positions 0 and 1 step 0.1

17.3.3 mark with a text node

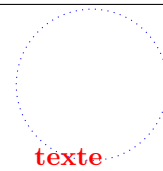
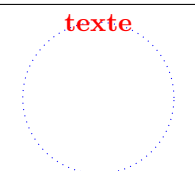
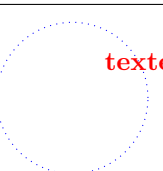
```
decoration={markings,mark=at position 1cm with \node[red]{texte}}
```



at position 1cm

at position 0.5

at position -1cm

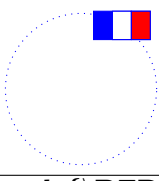
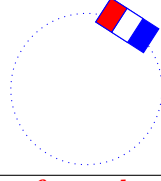
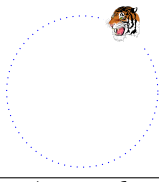
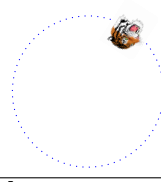


at position 1cm/2

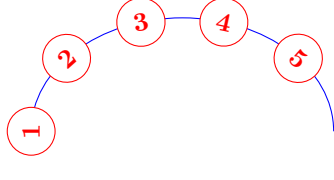
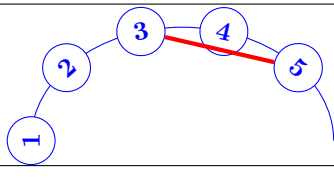
at position 0.5/2

at position -0.5/2

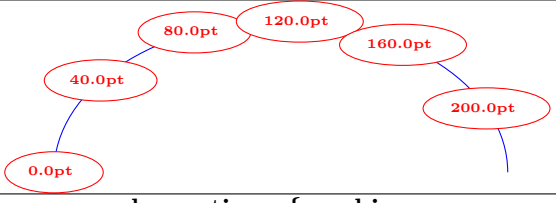
17.3.4 Mark with a picture node

<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>

17.3.5 mark numbered

	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>\draw [red,ultra thick] (marque-3) - - (marque-5);</code>

17.3.6 Mark info

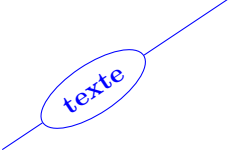
	
decoration={markings, mark=between positions 0 and 1 step 40pt with { \node [red,draw,ellipse,fill=white,font=\tiny] {\pgfkeysvalueof{/pgf/decoration/mark info/distance from start} }}; } }	

/pgf/decoration/reset marks (no value)

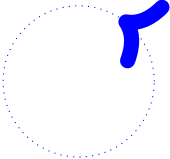
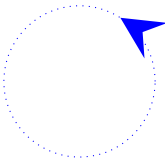
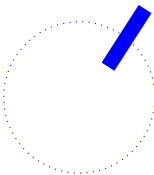
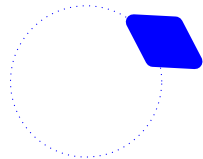
/pgf/decoration/mark connection node=node name (no default, initially empty)

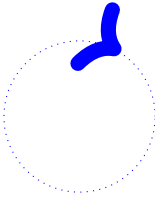
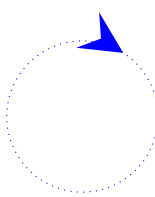
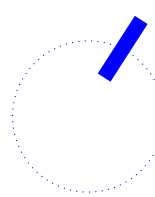
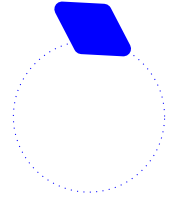
17.3.7 Nœud sur une liaison

17.3.8 mark connection node

	<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>
---	---

17.3.9 Arrow Tip Markings

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

17.4 Library “ decorations.footprints “

Load package : `\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 = gnome	foot of = human (By default)	foot of = bird	foot of = felis silvestris

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

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

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

17.5 Library “ decorations.shapes “

17.5.1 introduction

`\usetikzlibrary{decorations.shapes}`

PGFmanual section : 48-5-3


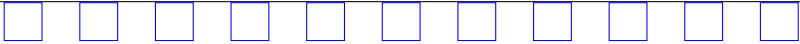



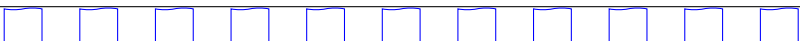
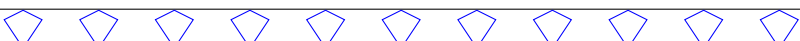

\draw[decorate,decoration=crosses] (0,0) - - (3,0);		
x x x x x x x x x	▷ ▷ ▷ ▷ ▷ ▷ ▷ ▷	o o o o o o o o o o o o
crosses	triangles	shape backgrounds

\draw[decorate,decoration={crosses,segment length=1cm}](0,0) - - (10,0);	
segment length = 1cm	x x x x x x x x x x
shape width = 1cm	
shape height = 1cm	
shape size = 1cm	
By default: shape width = shape height = 2.5pt	





17.5.2 ” shape backgrounds “





\draw[decorate with=dart] (0,2.5) - - (3,2.5);			
▷▷▷▷▷▷▷▷▷▷▷▷▷▷	◇◇◇◇◇◇◇◇◇◇◇◇	□□□□□□□□□□□□	o o o o o o o o o o o o
dart	diamond	rectangle	circle
☆☆☆☆☆☆☆☆☆☆☆☆	◇◇◇◇◇◇◇◇◇◇◇◇	▷▷▷▷▷▷▷▷▷▷▷▷▷▷	▽▽▽▽▽▽▽▽▽▽▽▽
star	regular polygon	signal	kite
Autres possibilités et paramètres voir page 71 et suivantes			

Shapes :



<i>syntaxe</i>	\draw[decorate,decoration={ shape backgrounds ,shape=dart, shape size=.5cm,shape sep=1cm}] (0,0) - - (10,0);										
<i>Autre syntaxe</i>	\draw[decorate with =dart,decoration={shape size=.5cm,shape sep=1cm}] (0,0) - (10,0);										
dart											
rectangle											
cloud											
star											
starburst											
tape											
kite											
signal											
By default: shape= circle											
Autres possibilités voir page 71 et suivantes											

Parameters :


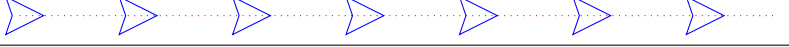
\draw[decorate with=star, star points =3,decoration={shape size=.5cm,shape sep=1cm}] (0,2.5) - - (3,2.5);			
			
star points=3	star points=4	star points=5	star points=8

\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

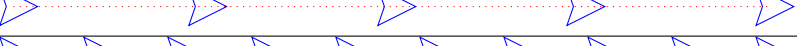
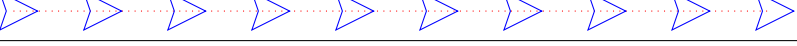
Spacing :

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

Type of spacing :

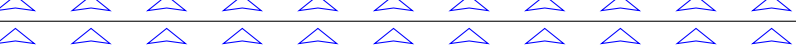
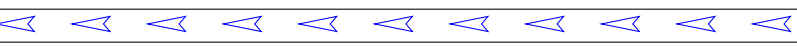

\draw[decorate with=dart,decoration={shape size=.5cm, shape sep={1cm, between centers }}] (0,2.5) - - (10,2.5);	
between centers	
between borders	
By default: between centers	

Automatic spacing :

\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 “ :

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

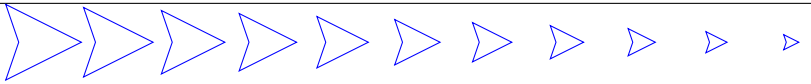


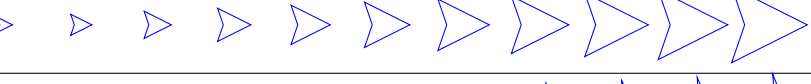
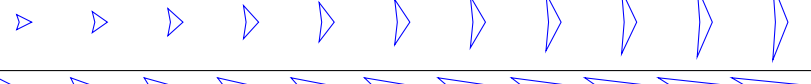
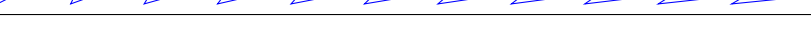
$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape width}=.5\text{cm},\text{shape sep}=1\text{cm},$ $\text{shape border rotate}=90,\text{shape sloped}=\text{true}\}] (0,0) - - (3,3);$	
shape sloped=true	shape sloped=false

” shift only “ :

$\text{decoration}=\text{transform}=\{\text{shift only}\},\text{shape width}=5\text{mm},\text{segment length}=.5\text{cm},\text{shape sep}=1\text{cm}$	
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	

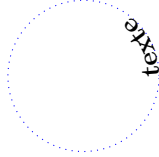
$\backslash\text{draw}[\text{decorate with}=\text{dart},\text{decoration}=\{\text{shape size}=.5\text{cm},$ $\text{shape start size}=1\text{cm},\text{shape scaled }\}\] (0,2.5) - - (10,2.5);$	
shape start size=1cm	
shape start height=1cm	
shape start width=1cm	
shape end size=1cm	
shape end height=1cm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

17.6 Library “decorations.text”

Load package : `\usetikzlibrary{decorations.text}`

PGFmanual section : 48-6

```
\draw[decorate,decoration={text along path,text={texte}}] (1,1) circle (1);
```



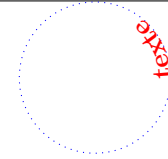
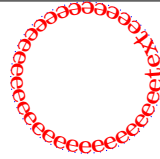
text too long :

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

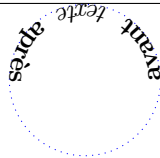
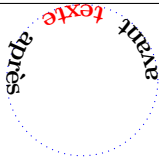


Text format :

```
\draw [decorate,decoration={text along path, text=avant |\red | texte | | après }]
```



text={avant |\red|texte| après } text={ |\red|texte| } text={ |\red|texte| {} }

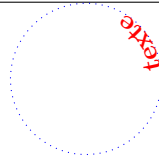


avant | \red | texte | | après avant | \it | texte | | après avant | \Huge | texte | | après

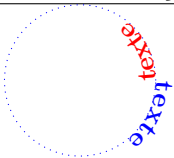
```
\draw [decorate,decoration={text along path,
text={avant |\Large Visual |+\bf color{red}|Tikz| après }}] (1,1) circle (1);
```



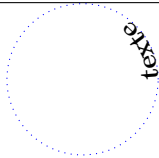
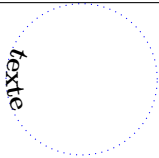
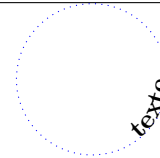
```
\draw [decorate,decoration={text along path,text format delimiters={}{}},
text={ [ \red ] texte [ ] }] (1,1) circle (1);
```

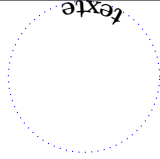
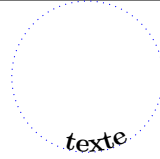


text orientation :

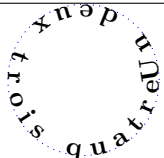
<code>\draw[decorate,decoration={text along path,text={texte}, text color=blue, reverse path }] (1,1) circle (1);</code>


text position :

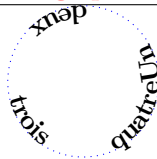
<code>\draw[decorate,decoration={ text along path,text={texte}, text align={align=left}}] (1,1) circle (1);</code>		
		
<code>align={align=left}</code>	<code>align={align=center}</code>	<code>align={align=right}</code>

<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>

fit to path :

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


fit to path stretching spaces :

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


17.7 Library “decorations.fractals”

Load package : `\usetikzlibrary{decorations.fractals}`

PGFmanual section : 48-7

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

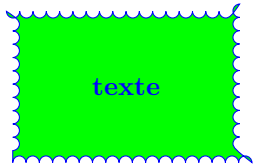
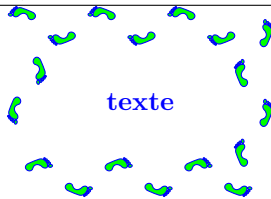
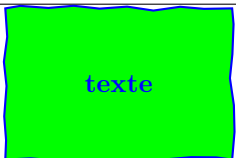



<code>\begin{tikzpicture}[decoration=Koch curve type 1]</code> <code>\draw decorate { decorate { (0,0) - (3,0) } };</code> <code>\end{tikzpicture}</code>			
Koch curve type 1	Koch curve type 2	Koch snowflake	Cantor set

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

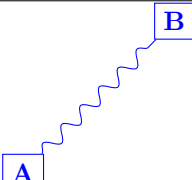
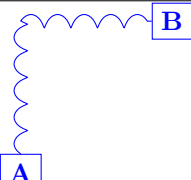
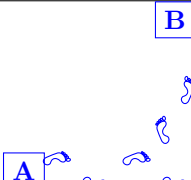
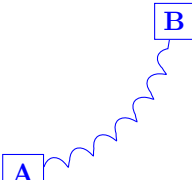
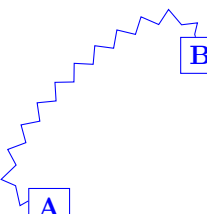
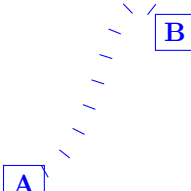
sans	1 decorate	2 decorate	3 decorate

17.8 Applications

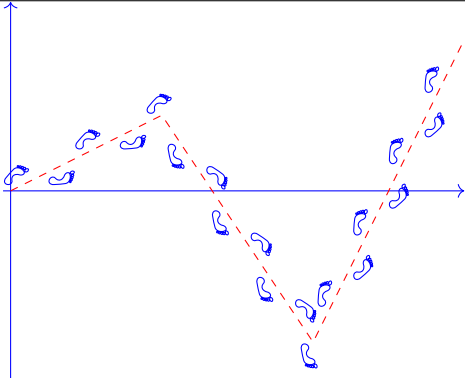
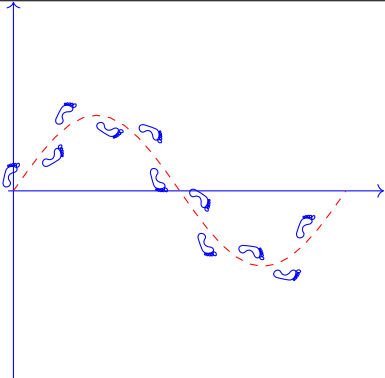
17.8.1 Decoration of a node

\node [draw,decorate,decoration={bumps, minimum height=2cm, minimum width=3cm}] {texte};	
	
decoration= bumps	decoration= footprints
	
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} }

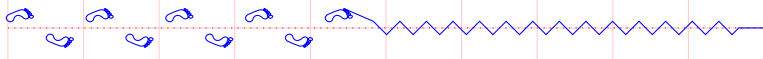
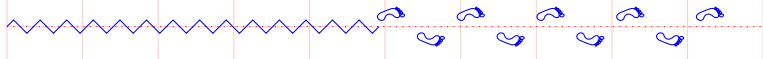
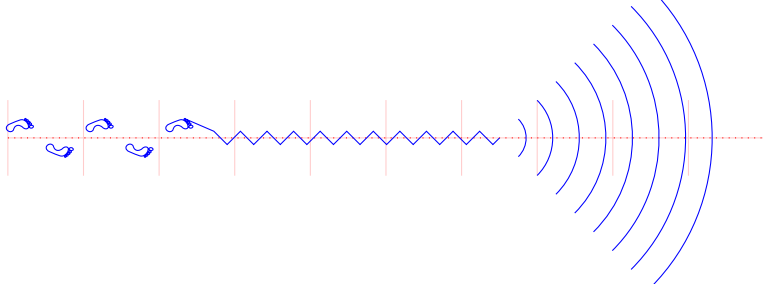
17.8.2 Decoration of node link

\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)





17.8.3 Decoration of a graph

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

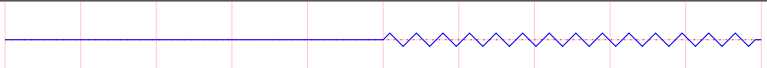
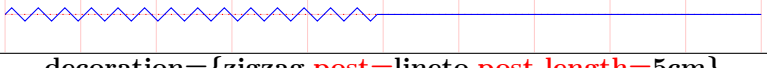
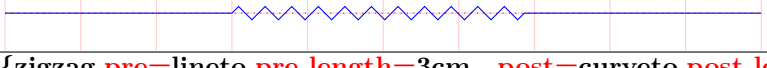
17.8.4 Various decoration

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


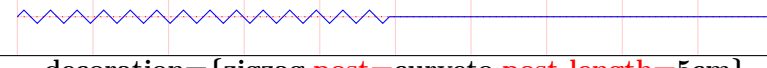
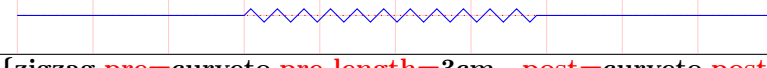
17.8.5 Partial decoration

	<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>

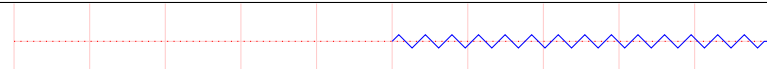
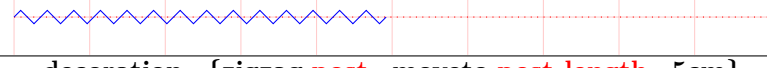
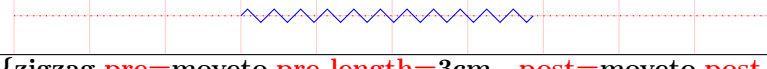
” lineto “ :

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

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

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

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

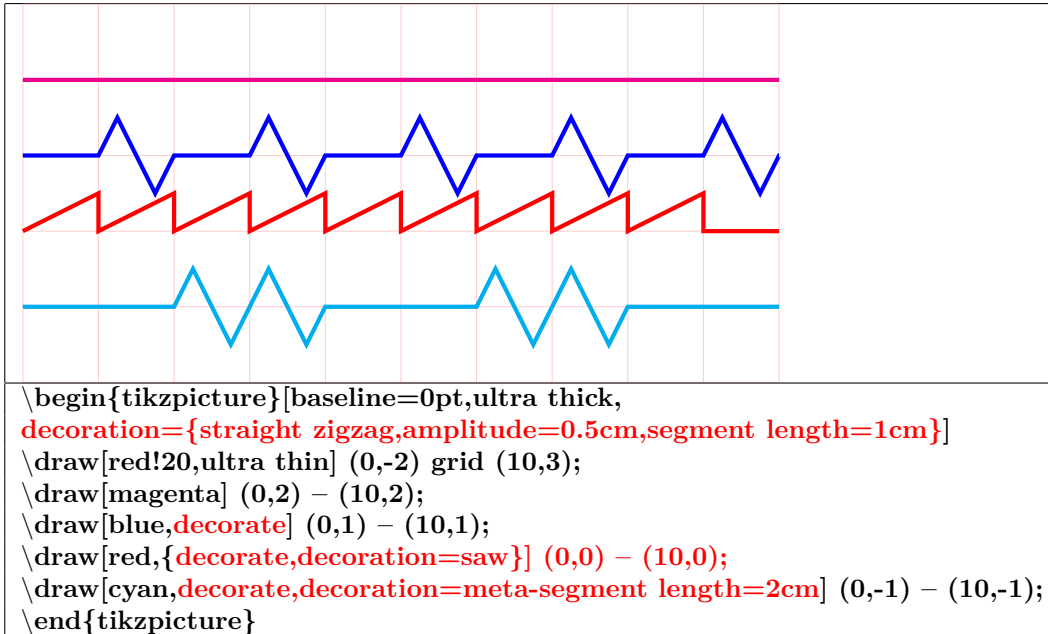
“ curveto “ :

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

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

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

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

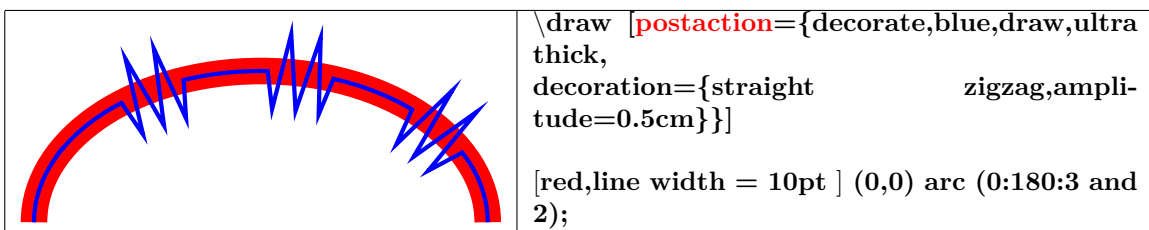
” moveto “ :

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

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

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

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

17.8.6 Global parameter, partialparameter

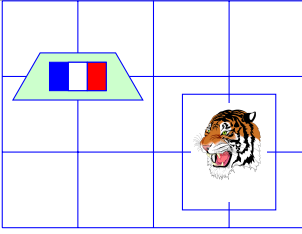


17.8.7 Path and its decoration “ Postaction “

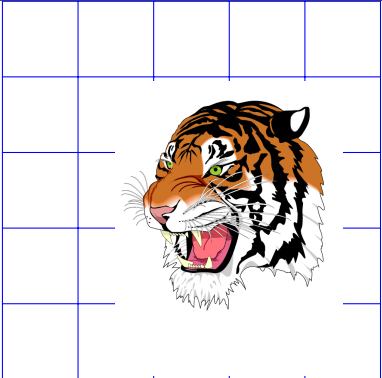


18 Picture in a TikZ picture

18.0.1 In a node

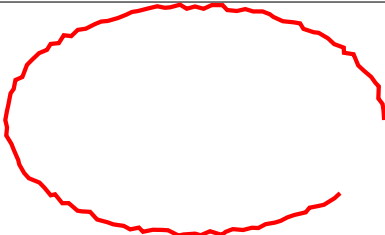
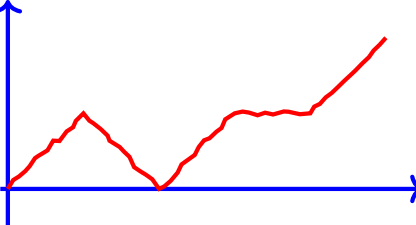
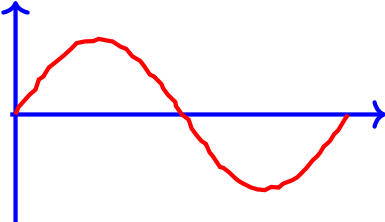
	<pre> \begin{tikzpicture} \draw (0,0) grid (5,3); \node [fill=green!20,trapezium,draw] at (1,2) {\DFR }; 68 \node [draw] at (3,1) {\includegraphics[width=1cm]{tiger} }; \end{tikzpicture} </pre>
---	---

18.0.2 With pgfdeclareimage

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

19 Freehand drawing

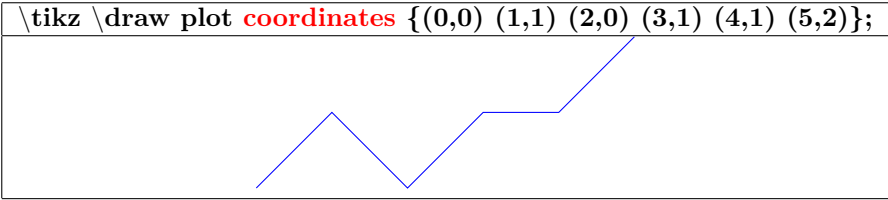
see page 86

	<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>

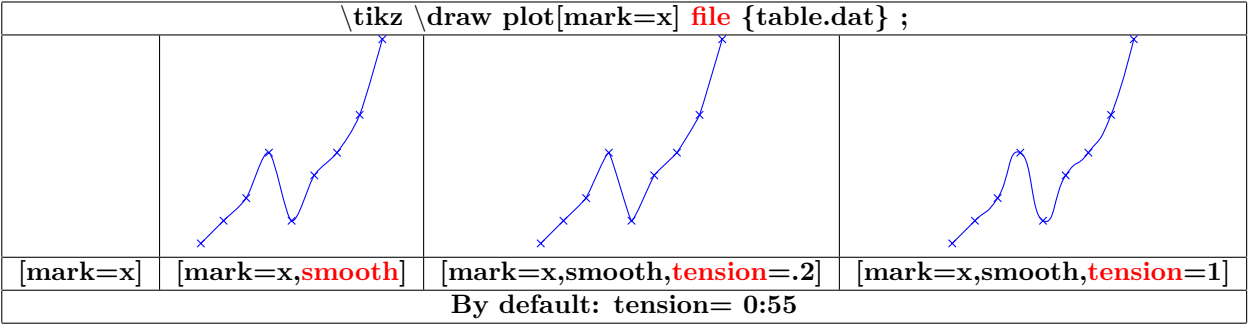
20 Creation of a graph

20.1 Graph with TikZ

20.1.1 From a list of points

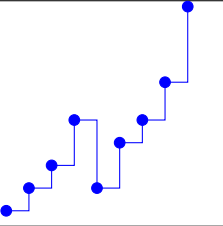
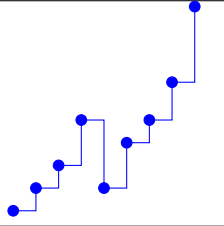
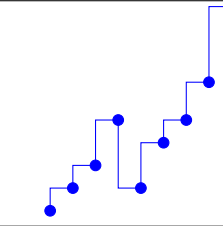
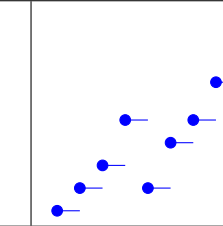
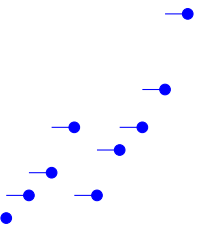
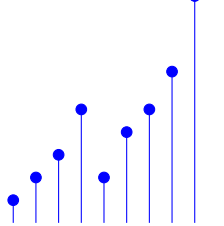
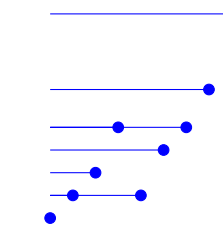
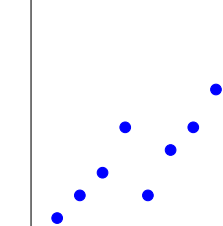


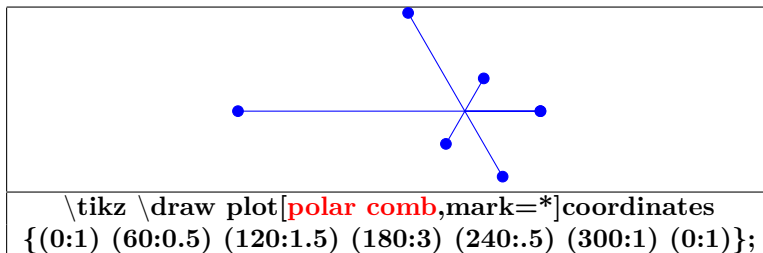
20.1.2 From a data file

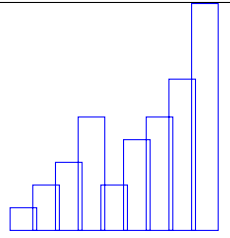
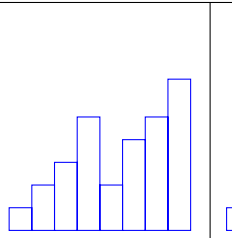
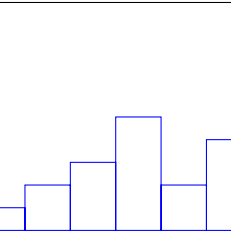
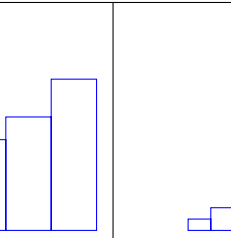


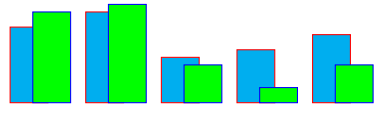
content of the file table.dat	
0.0	0.3
0.3	0.6
0.6	0.9
0.9	1.5
1.2	0.6
1.5	1.2
1.8	1.5
2.1	2.0
2.4	3.0

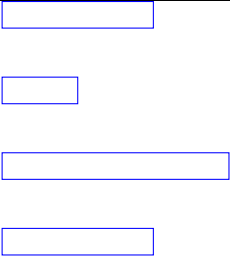
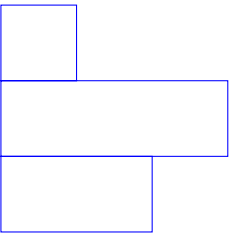
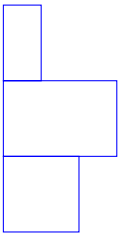
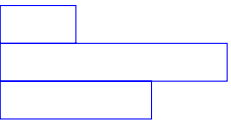
20.1.3 Type of graph

\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

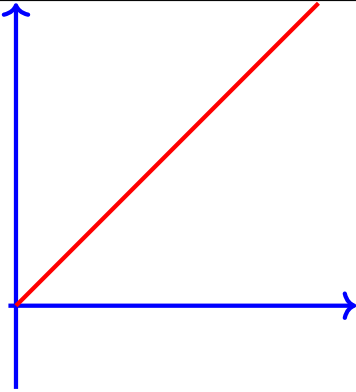
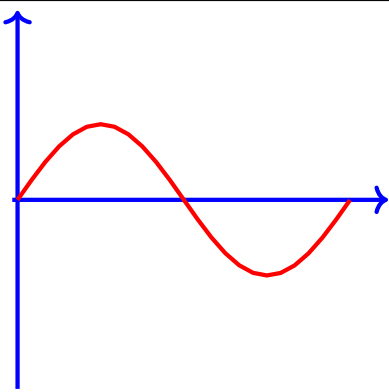
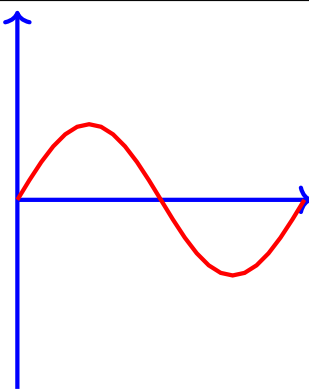


\tikz \draw plot[ybar] file {table.dat} ;			
			
[ybar]	[ybar interval]	[ybar interval,x=2cm]	[ybar interval,y=.5cm]

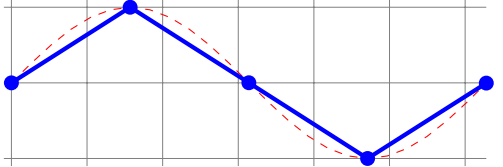
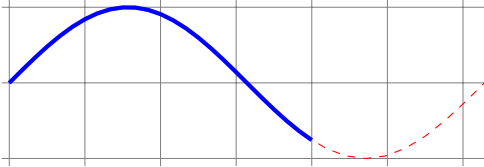
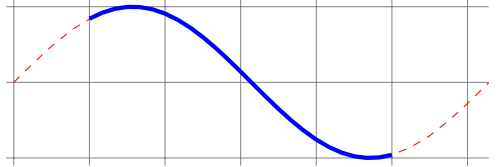
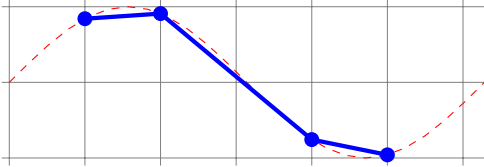
	<pre> \begin{tikzpicture} \draw[red,fill=cyan,ybar,bar width=.5cm] plot coordinates {(0,1) (1,1.2) (2,.6) (3,.7) (4,.9)}; \draw[blue,fill=green,ybar,bar width=.5cm,bar shift=.3cm] plot coordinates {(0,1.2) (1,1.3) (2,.5) (3,.2) (4,.5)}; \end{tikzpicture} </pre>
---	---

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

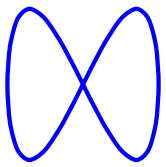
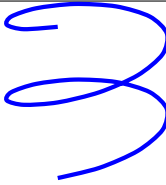
20.1.4 Graph of a function

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

Options

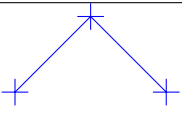
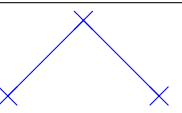
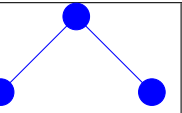
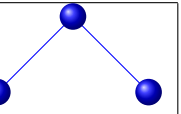
<code>\draw[color=red,dashed] plot(\x,\{\sin(\x r)\});</code> <code>\draw[color=blue,samples=5,mark=*,ultra thick] plot(\x,\{\sin(\x r)\});</code>	
	
<code>[color=blue,samples=5,mark=*]</code>	<code>[color=blue,domain=0:4]</code>
	
<code>[color=blue,domain=1:5]</code>	<code>[color=blue,samples at={1,2,4,5},mark=*]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

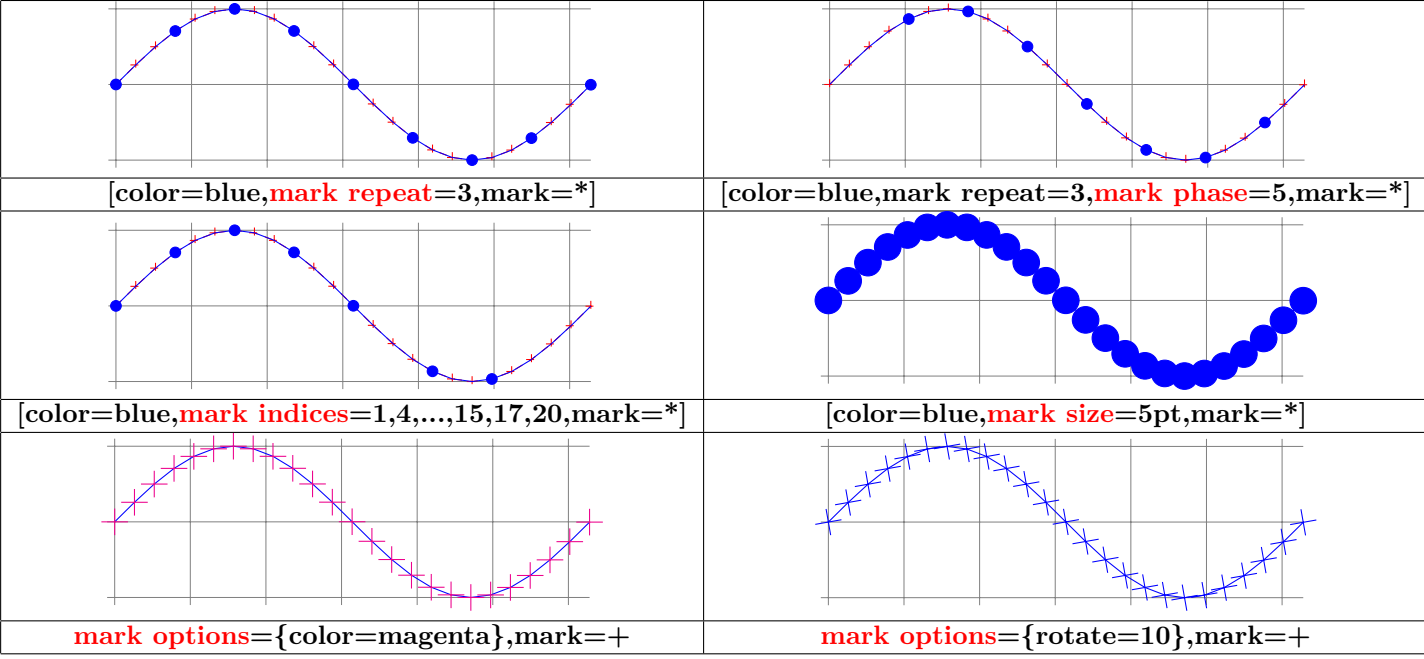
20.1.5 Parametric function

<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>	
	
$(\{\sin(\t r)\},\{\sin(2 *\t r)\})$	$(\{\sin(\t)\},\t/360,\{\cos(\t)\})$

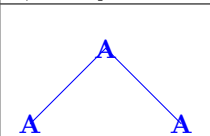
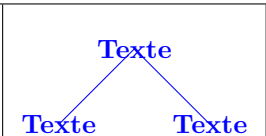
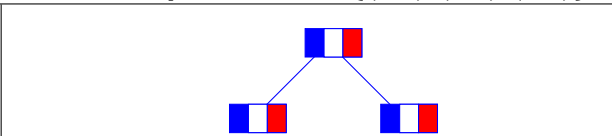
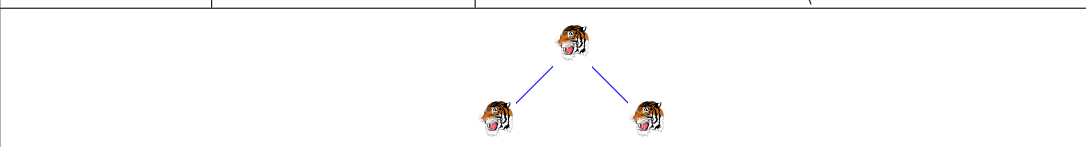
20.2 Marks

20.2.1 Marks with TikZ

			
mark=+	mark=x	mark=*	mark=ball



20.2.2 Marks with text mark

\draw[mark=text,text mark=A,mark size=5pt] coordinates {(0,0) (1,1) (2,0)};		
		
<code>text mark=A</code>	<code>text mark=Texte</code>	<code>text mark=\DFR 68</code>
		
<code>text mark={\includegraphics[width=.5cm]{tiger}}</code>		

20.2.3 Marks with plotmarks library

Load package : `\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*

20.3 Graph with Gnuplot

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

==> `plot[id=sin]` create the file "sin.gnuplot"

==> Open the file "sin.gnuplot" with the program gnuplot : creation of the file "sin.table"

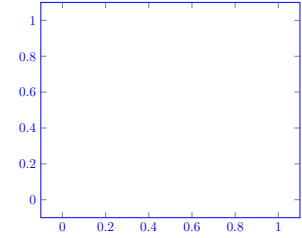
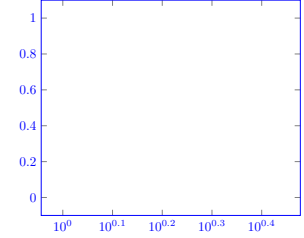
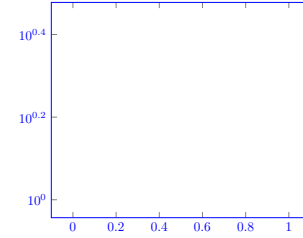
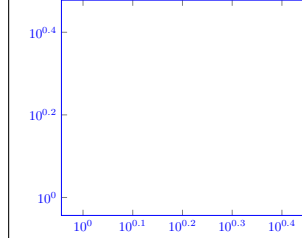
==> Use the datafile "sin.table"

21 Creation of a graph with pgfplots

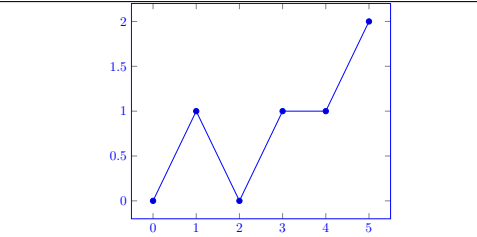
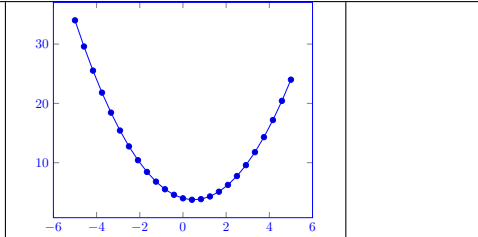
Load package : `\usepackage{pgfplots}`

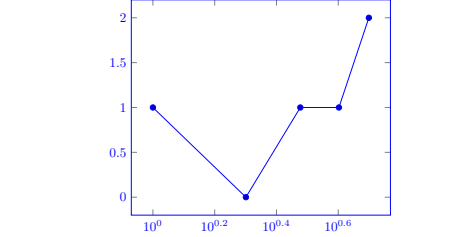
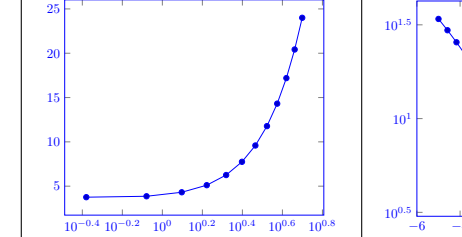
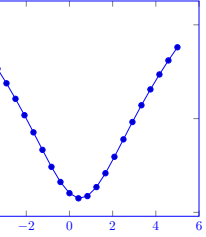
21.1 2D graph

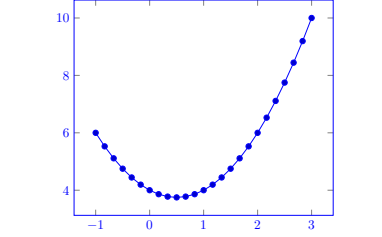
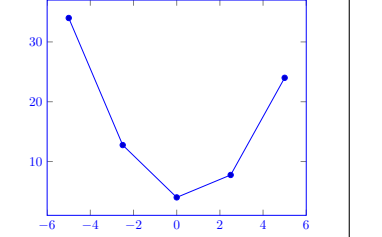
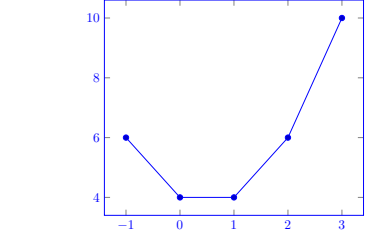
21.1.1 Axes

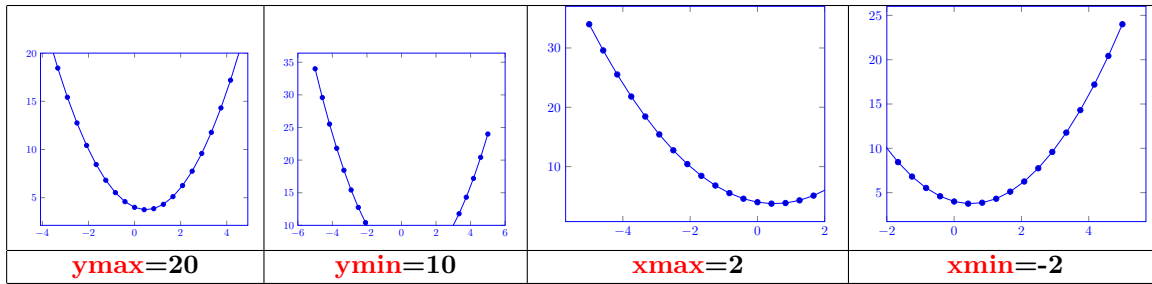
			
<code>\begin{axis}</code>	<code>\begin{semilogxaxis}</code>	<code>\begin{semilogyaxis}</code>	<code>\begin{loglogaxis}</code>
<code>\end{axis}</code>	<code>\end{semilogxaxis}</code>	<code>\end{semilogyaxis}</code>	<code>\end{loglogaxis}</code>

21.1.2 Drawing of the graph

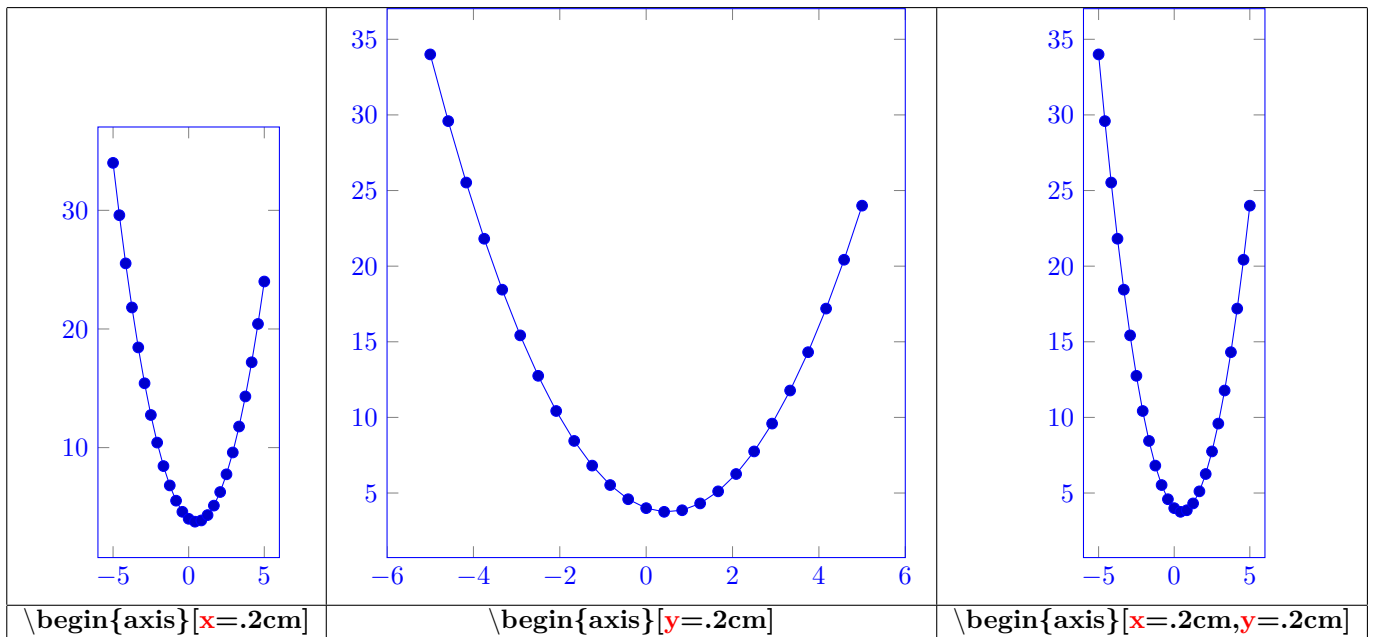
		
<code>\addplot coordinates {(0,0) (1,1) (2,0) (3,1) (4,1) (5,2)};</code>	<code>\addplot {x^2 - x +4};</code>	<code>\addplot gnuplot[id=sin]{sin(x)};</code>

		
axes : semilogxaxis	axes : semilogxaxis	axes : semilogyaxis
<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>

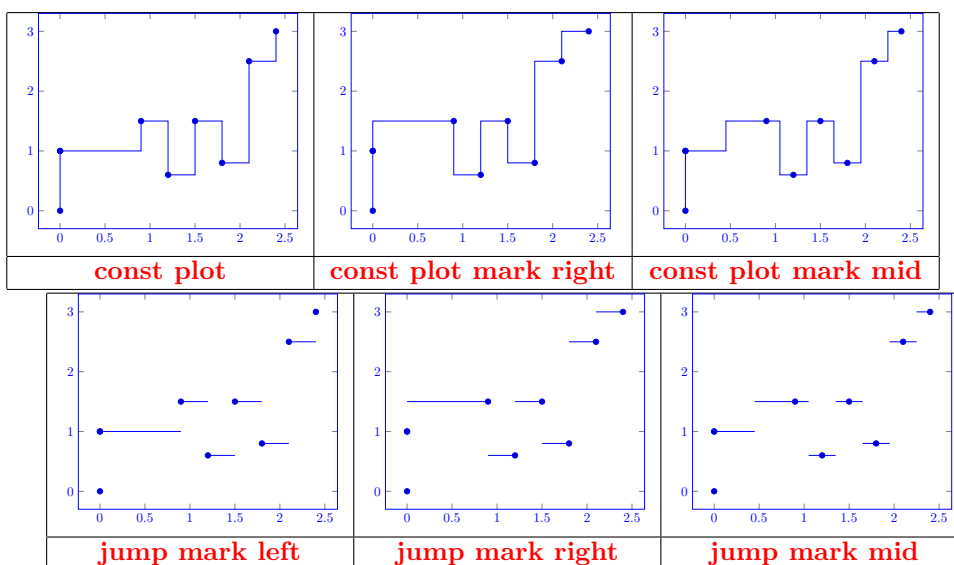
		
<code>\begin{axis}[domain=-1:3]</code>	<code>\begin{axis}[samples=5]</code>	<code>\begin{axis}[domain=-1:3,samples=5]</code>

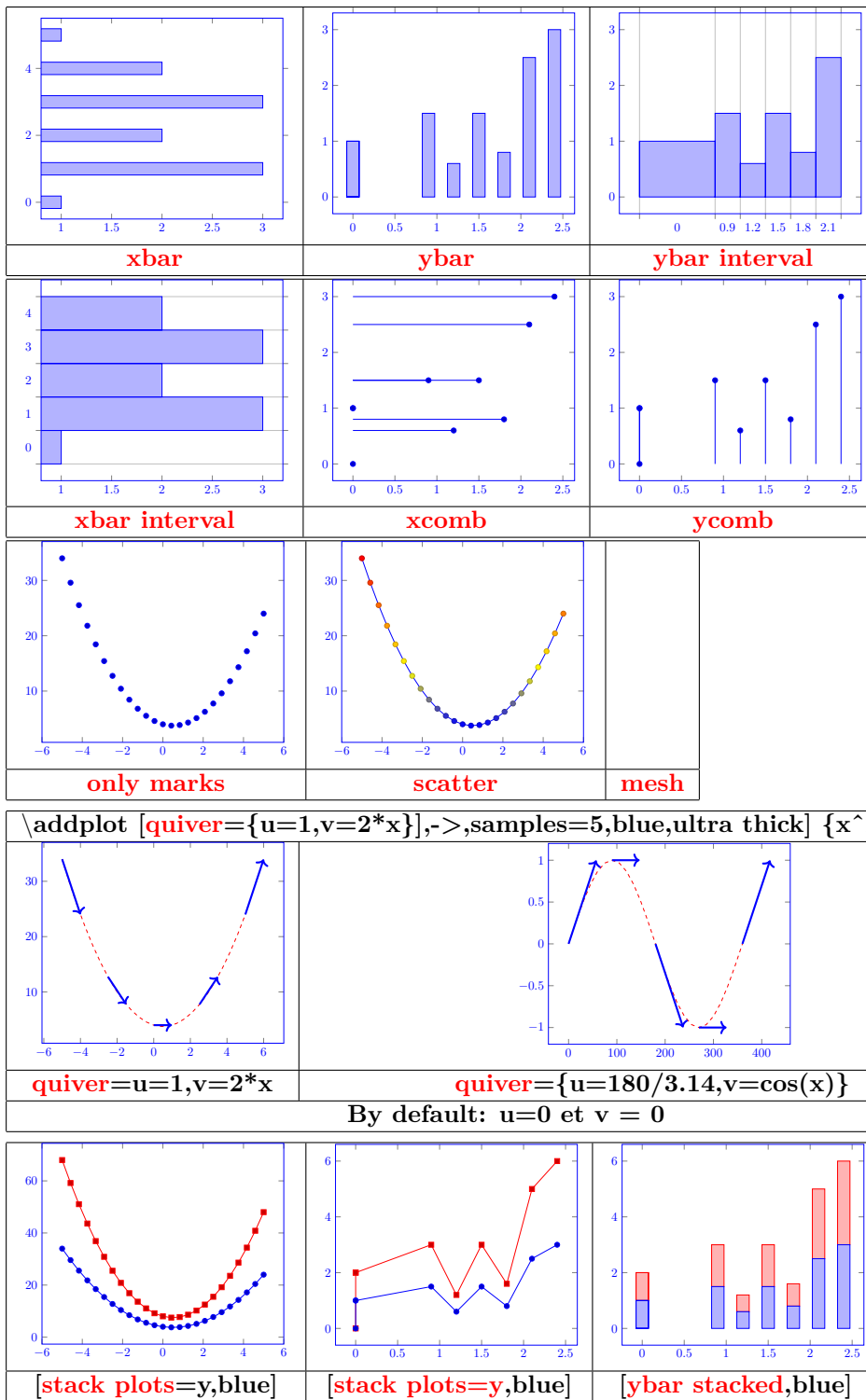


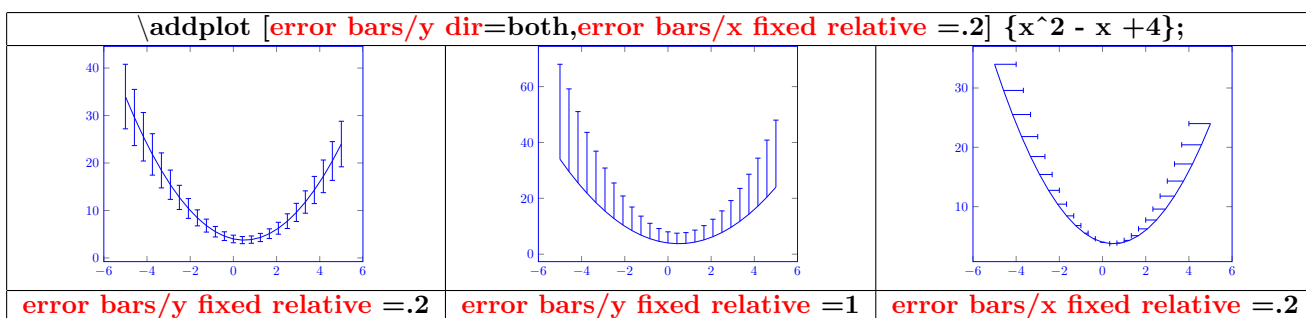
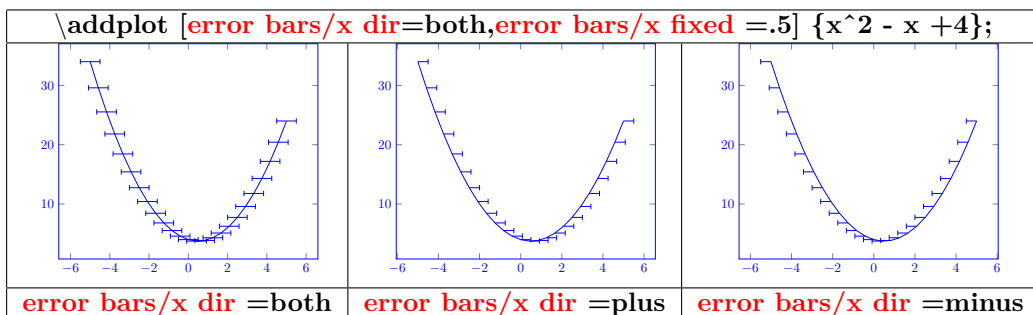
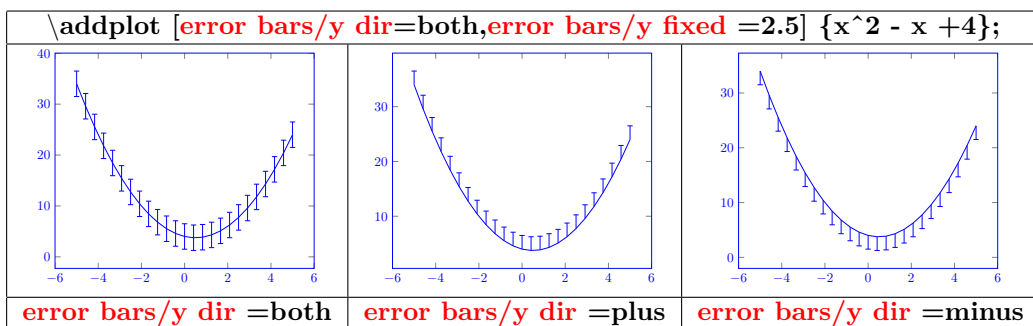
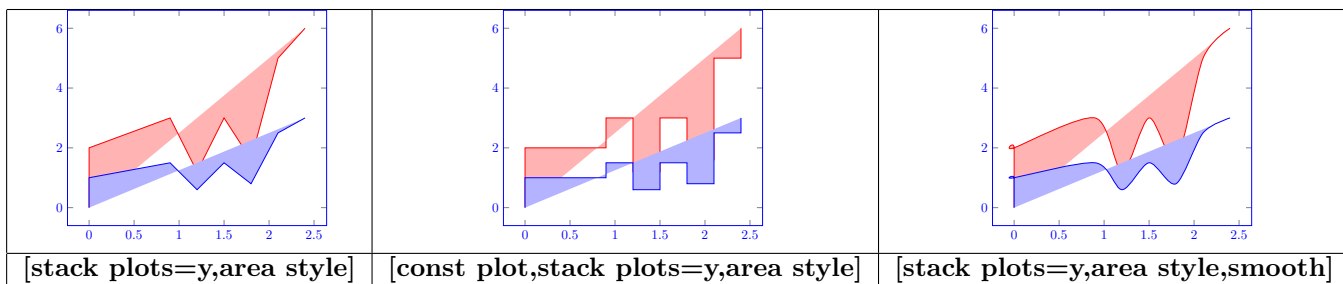
21.1.3 Xunit and Yunit



21.1.4 Type of graph

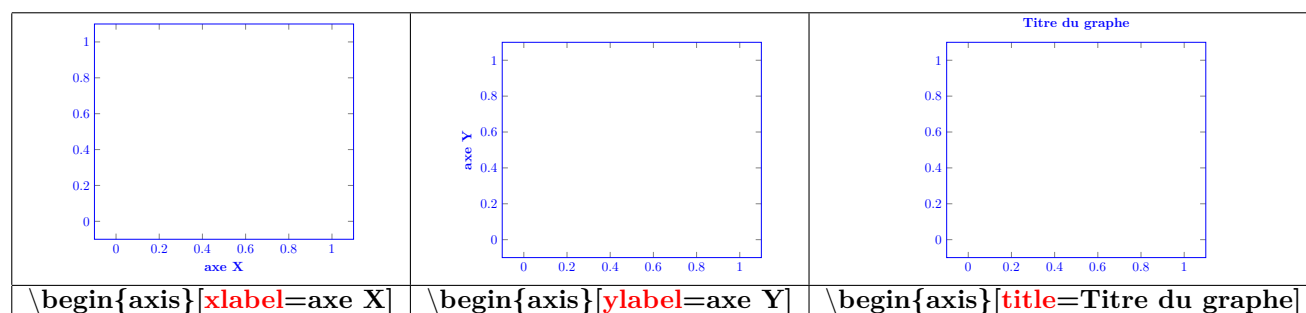




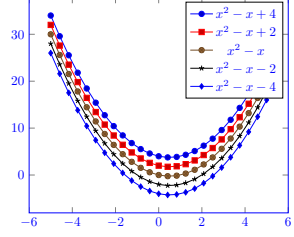
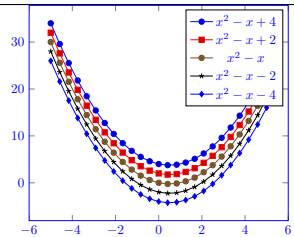


21.2 Graph information

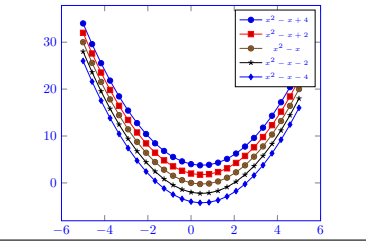
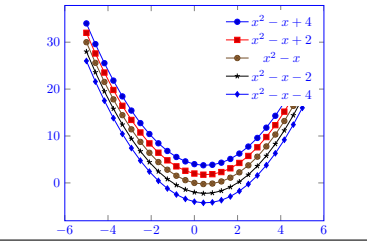
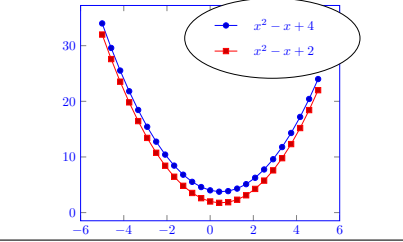
21.2.1 Titles

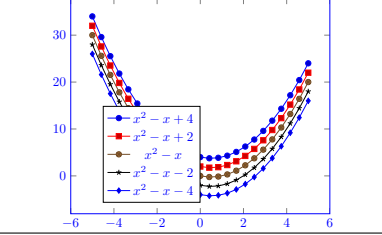
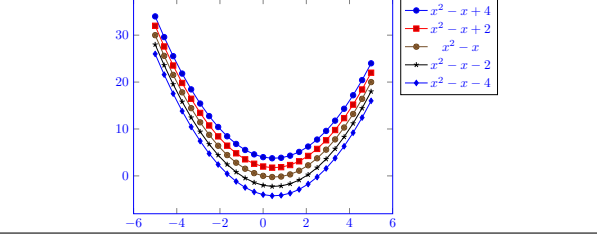


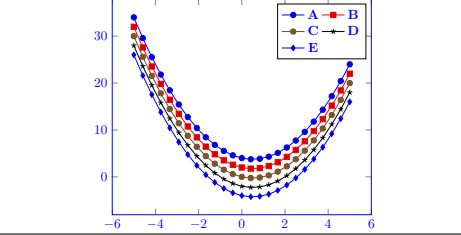
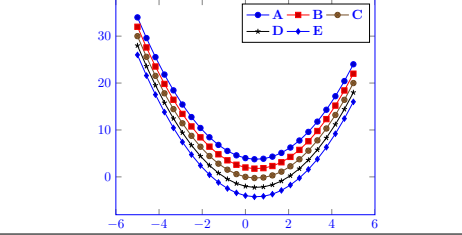
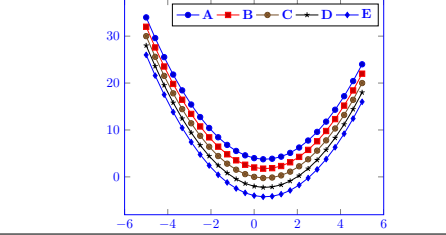
21.2.2 Legend

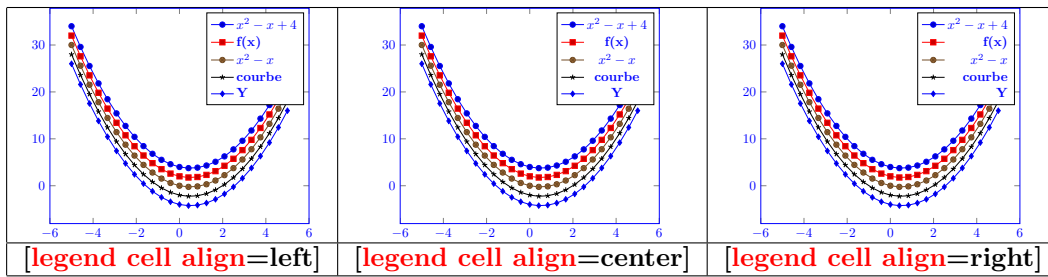
	<pre> \begin{axis} \addplot {x^2 - x +4}; \addplot {x^2 - x +2}; \addplot {x^2 - x }; \addplot {x^2 - x -2 }; \addplot {x^2 - x -4 }; \legend{\$x^2 - x +4\$,\$x^2 - x +2\$,\$x^2 - x \$,\$x^2 - x -2 \$,\$x^2 - x -4 \$} \end{axis} </pre>
	<pre> \begin{axis}[legend entries= {\$ x^2 - x +4 \$,\$ x^2 - x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

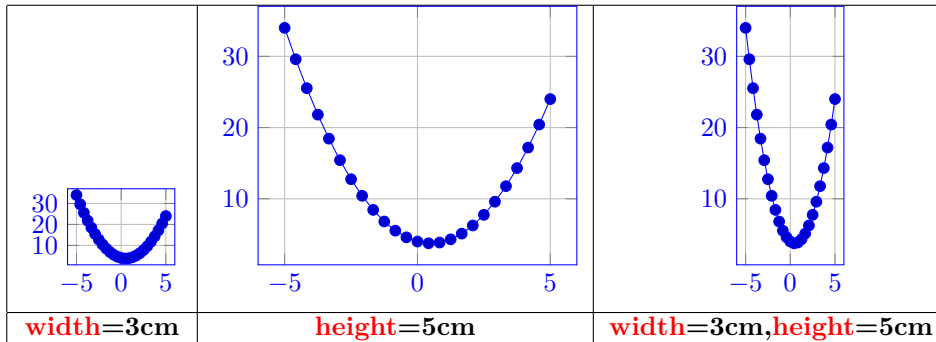
		
legend style={font=\tiny}	legend style={draw=none}	legend style={shape=ellipse}

	
legend style={at={(.5,.5)}}	legend style={legend pos=outer north east}

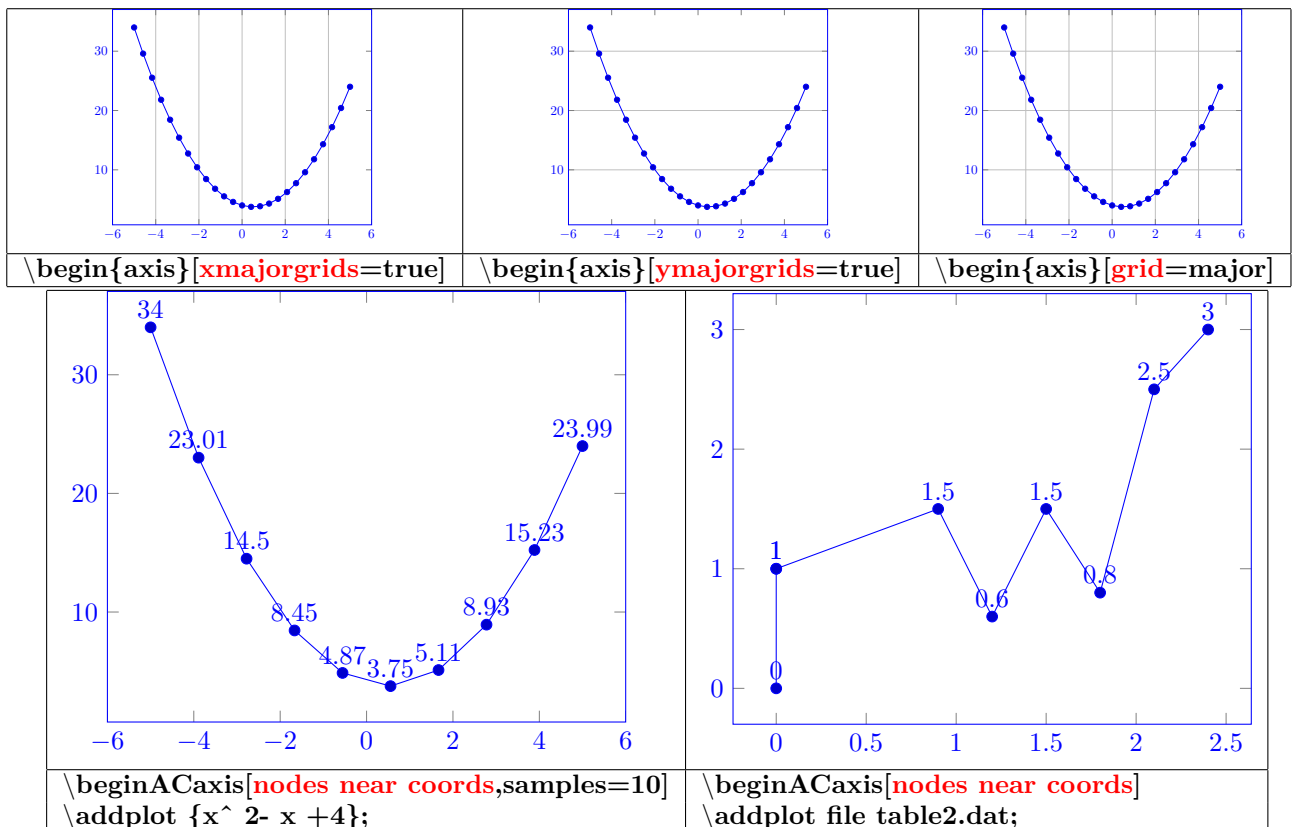
		
legend style={legend columns=2}	legend style={legend columns=3}	legend style={legend columns=5}



21.2.3 Size of the graph

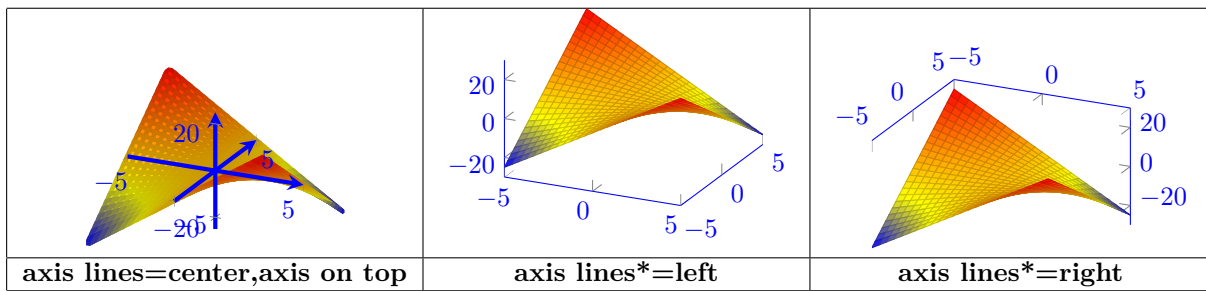
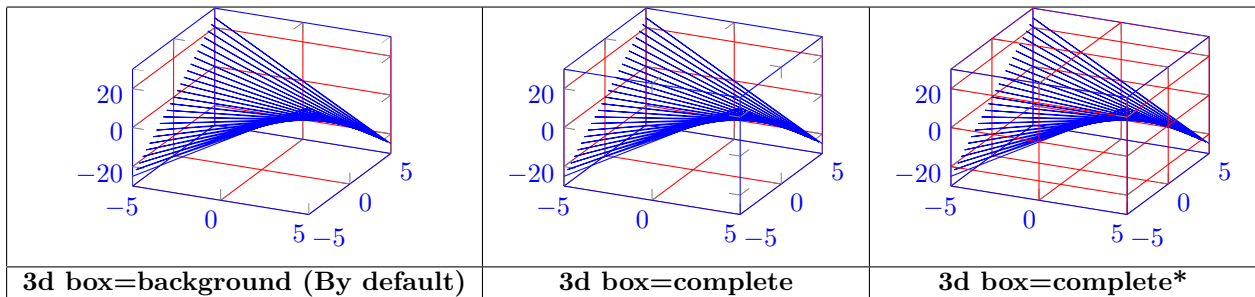
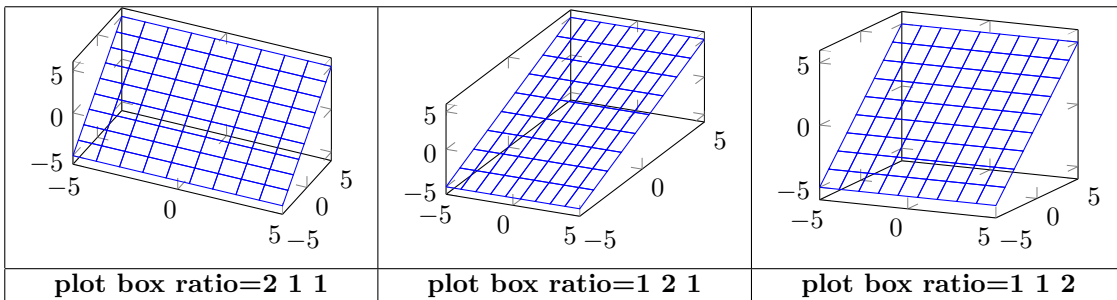


21.2.4 Grids

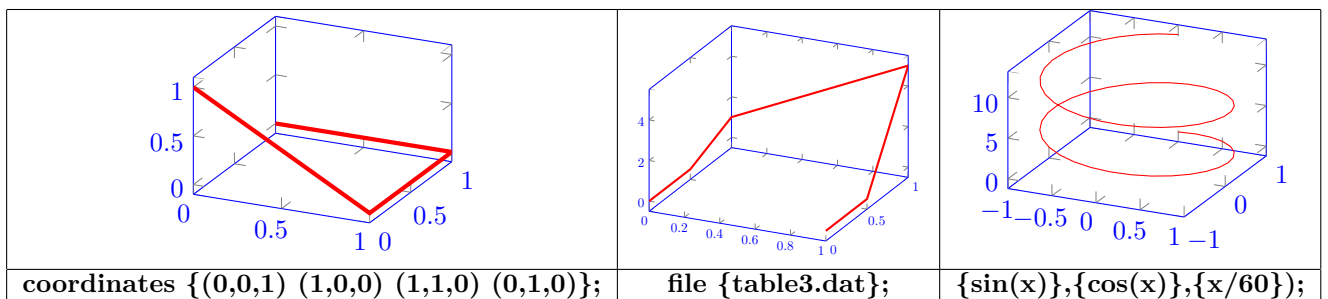
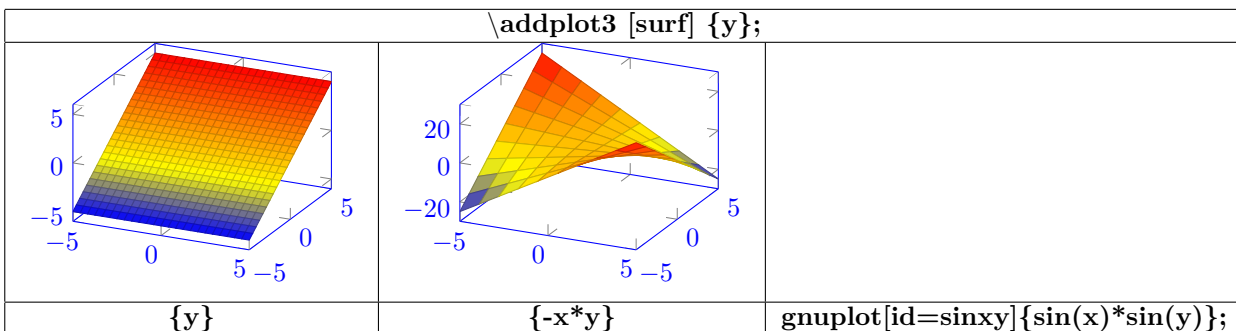


22 3D graph

22.0.1 Axes



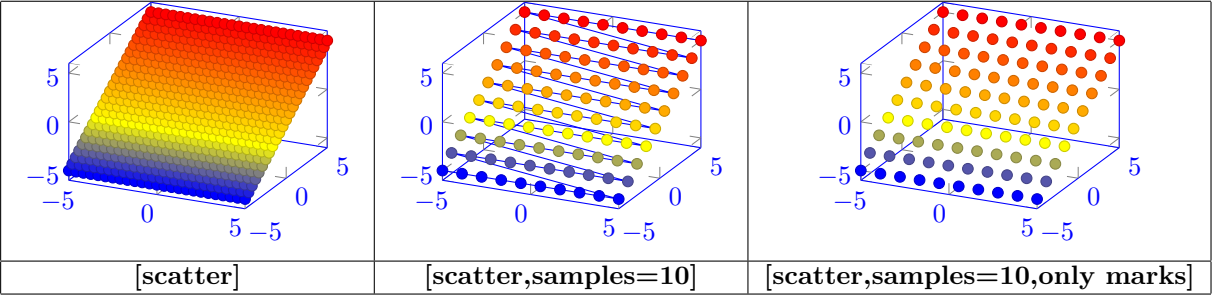
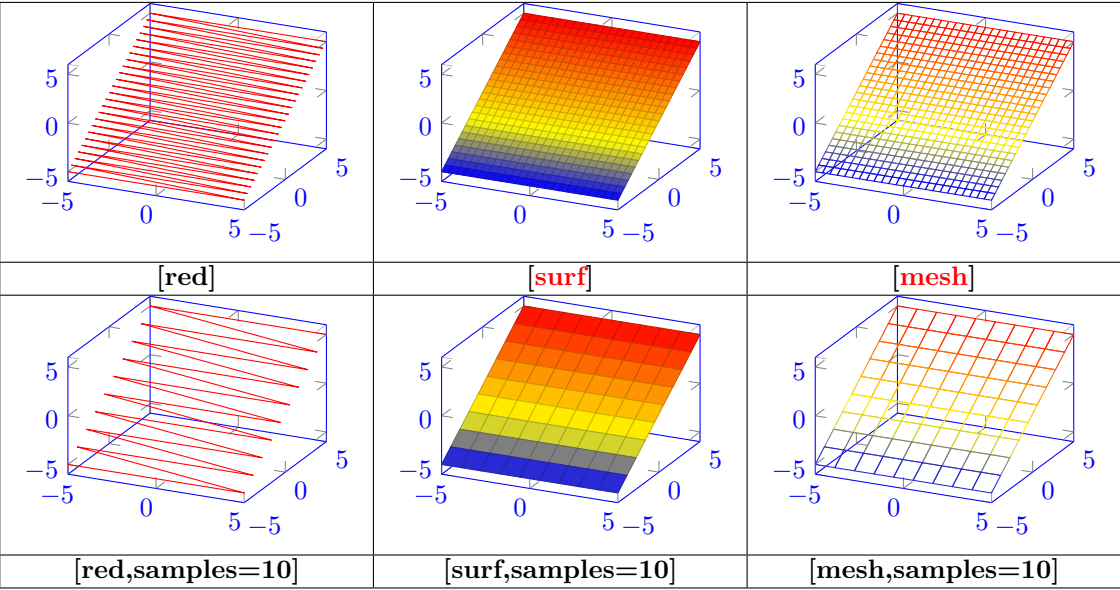
22.0.2 Drawing of the graph

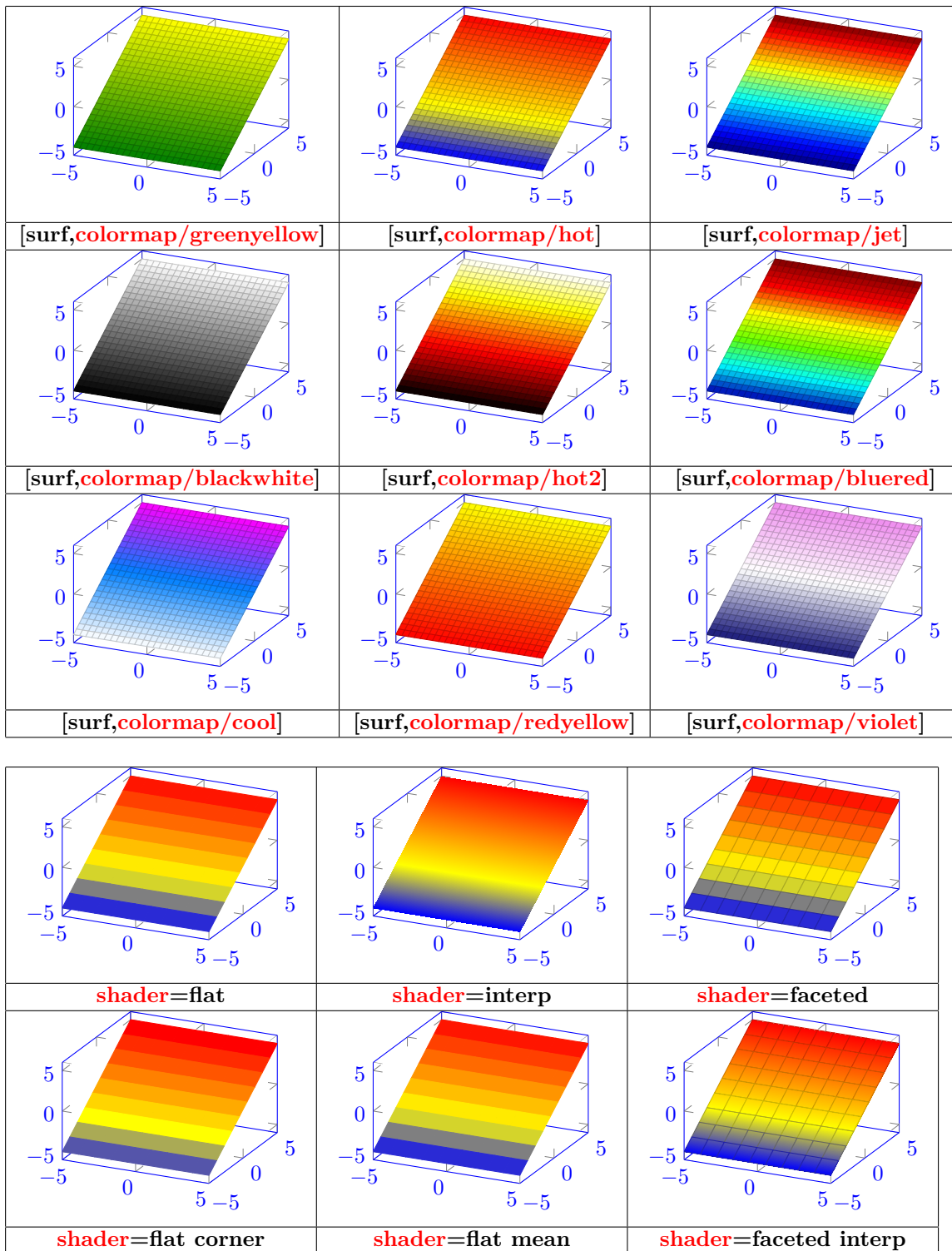


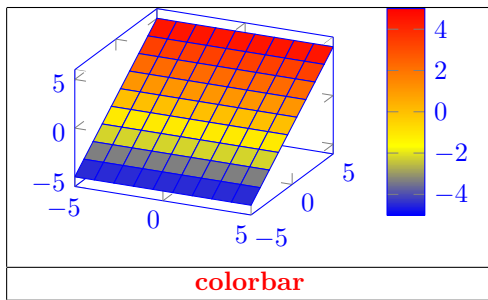
Content of the file table3.dat :

0	0	0
0	.5	0
0	1	1
1	1	5
1	.5	0
1	0	0

22.0.3 Aspect







22.0.4 Viewpoint

Azimut
 $\text{view/az} = \text{angle de } -50 \text{ à } +50$

Élévation
 $\text{view/el} = \text{angle de } -50 \text{ à } +50$

23 Table of a function variation

Load package : `\usepackage{tkz-tab}`

23.1 Creation of the table

1° ligne	a	b	c
2° ligne			

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

23.1.1 Options

Row width			
1° ligne	a	b	c
2° ligne			
3° ligne			

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

First column width			
x	a	b	c

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

Space between two values			
x	a	b	c

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

Margin			
x	a	b	c

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

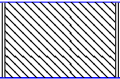
Line width			
x	a	b	c
$\backslash\text{tkzTabInit}[\text{dlw}=2\text{pt}]\{ x / 1\}\{ a , b , c \};$ By default: lw=0,4 pt			

No cadre			
x	a	b	c
$\backslash\text{tkzTabInit}[\text{nocadre}]\{ x / 1\}\{ a , b , c \};$ By default: nocadre=false			

Coloring			
\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]	
By default: color = false colorT=colorC=colorL=colorV =white			

23.2 creation of a sign row

x	a	b	c
$f(x)$	2	4	
$\backslash\text{tkzTabLine}\{ \textcolor{red}{t}, 2,\textcolor{red}{t},4,\textcolor{red}{t} \}$			
x	a	b	c
$f(x)$	2	4	
$\backslash\text{tkzTabLine}\{ \textcolor{red}{d}, 2,\textcolor{red}{d},4,\textcolor{red}{d} \}$			
x	a	b	c
$f(x)$	1	3	4 5
$\backslash\text{tkzTabLine}\{ 1,\textcolor{red}{h}, 3 ,4 ,5 \}$			

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

```

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

```

23.3 Creation of a variation row

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

```
\tkzTabVar{ +/1 , -/2 }
```

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

```
\tkzTabVar{ -/1 , +/2 }
```

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

```
\tkzTabVar{ -/1 , -/2 }
```

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

```
\tkzTabVar{ +/1 , +/2 }
```

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

```
\tkzTabVar{ +C/1 , -/2 }
```

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

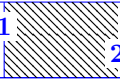
```
\tkzTabVar{ -C/1 , +/2 }
```

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

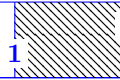
```
\tkzTabVar{ -/1 , -C/2 }
```

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

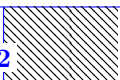
```
\tkzTabVar{ +/1 , +C/2 }
```

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

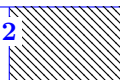
```
\tkzTabVar{ +H/1 , -/2 }
```

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

```
\tkzTabVar{ -H/1 , +/2 }
```

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

```
\tkzTabVar{ -/1 , -H/2 }
```

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

```
\tkzTabVar{ +/1 , +H/2 }
```

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

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

Emphasizing a value			
x	a	b	c
$f(x)$	1	<div> <div>→</div> <div>2</div> <div>→</div> <div>2</div> <div>→</div> <div>3</div> </div>	

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

Multicolumn variation			
x	a	b	c
$f(x)$	1	<div> <div>→</div> <div>3</div> </div>	

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

Intermediate values							
x	a	A	b		c		
$f(x)$	1	<div> <div>→</div> <div>x</div> <div>→</div> <div>3</div> </div>					

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

x	a	b	A	c
$f(x)$	1	<div> <div>→</div> <div>x</div> <div>→</div> <div>3</div> </div>		

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

x	a	A	b	c
$f(x)$	1	<div> <div>→</div> <div>x</div> <div>→</div> <div>3</div> </div>		

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

Picture insertion				
x	a	b	c	d
$f(x)$	1	<div> <div>→</div> <div>x</div> <div>→</div> <div>3</div> </div>		

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


x	a	b	c	d
$f(x)$	1	<div> <div>→</div> <div>x</div> <div>→</div> <div>3</div> </div>		

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


24 Repetitions

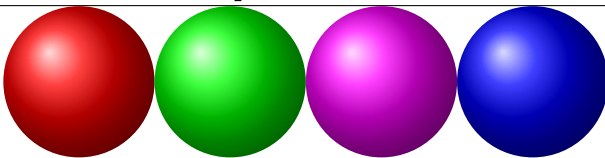
Utilisation package “pgffor” automatically loaded with TikZ

24.1 One variable repetition


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

24.2 Two variables repetition

Numerical variables

<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

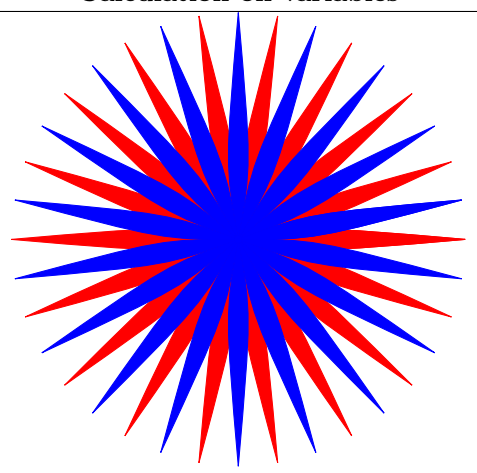
Composite variables

<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

Variables with a step								
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

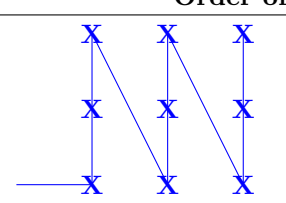
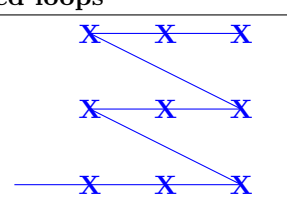
```
\begin{tikzpicture}
\foreach \x in {1,2,...,4,7,8,...,10}
\foreach \y in {1,...,3}
{ \draw (\x,\y) +(-.5,-.5) rectangle ++(.5,.5); \draw (\x,\y)
node\x,\y; }
\end{tikzpicture}
```

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^...,2^7} {\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>

Calculation on variables

<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 \x : angle

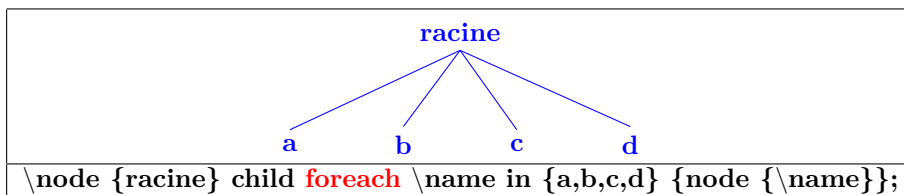
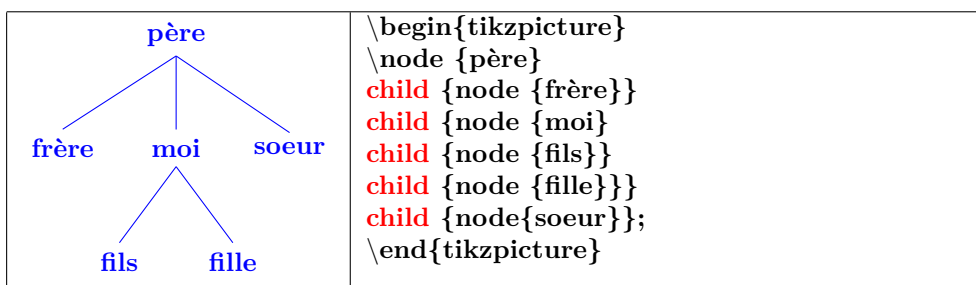
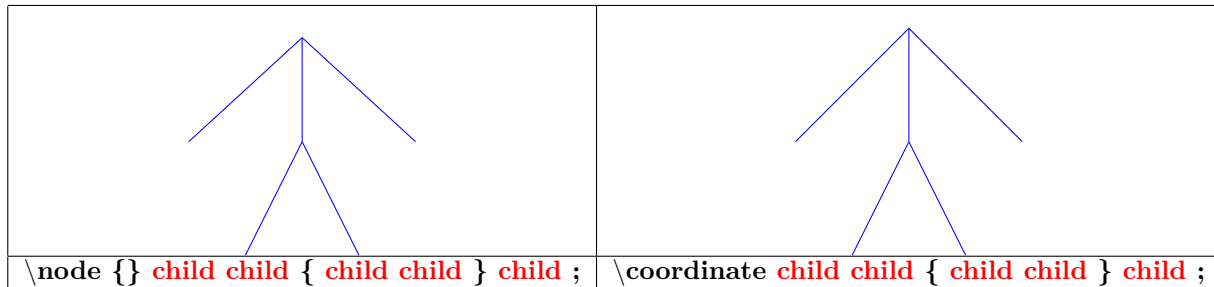
24.3 Nested loops

Order of the nested loops	
	
<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>

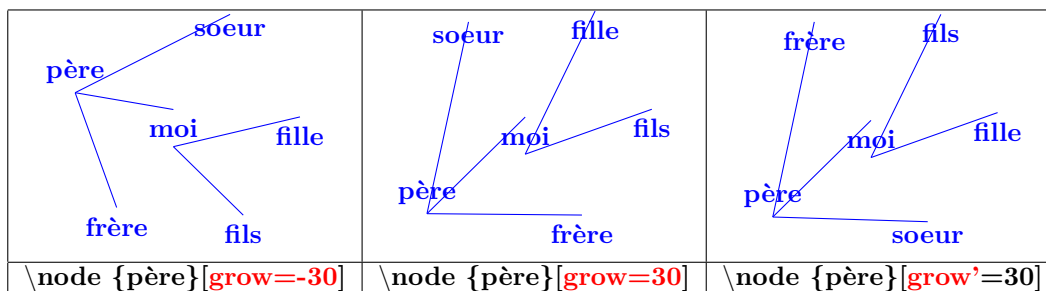
25 Tree diagram

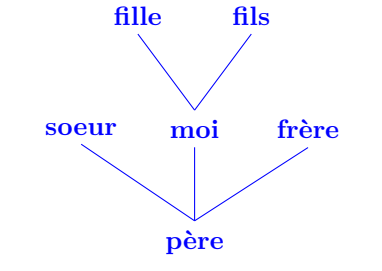
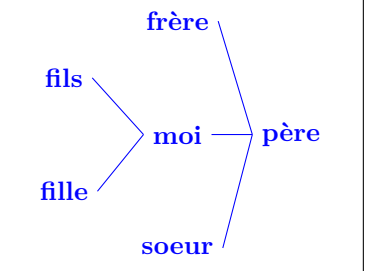
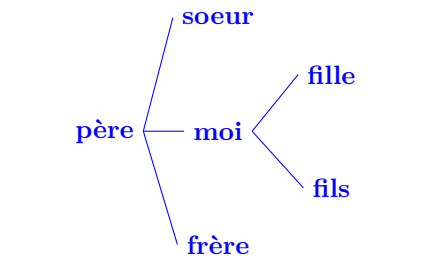
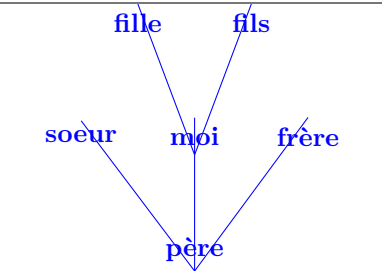
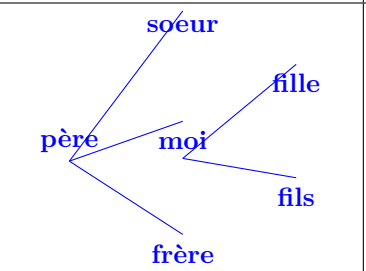
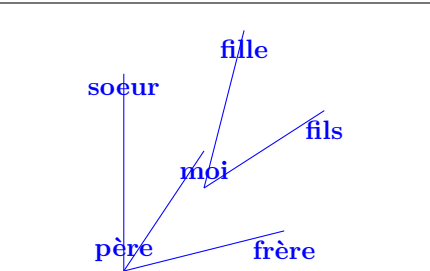
PGFmanual section : 21

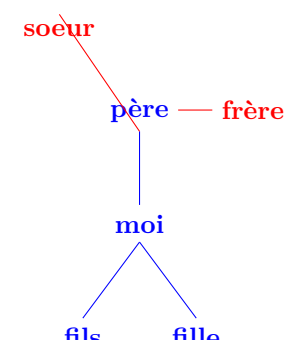
25.1 Structure



25.2 Orientation

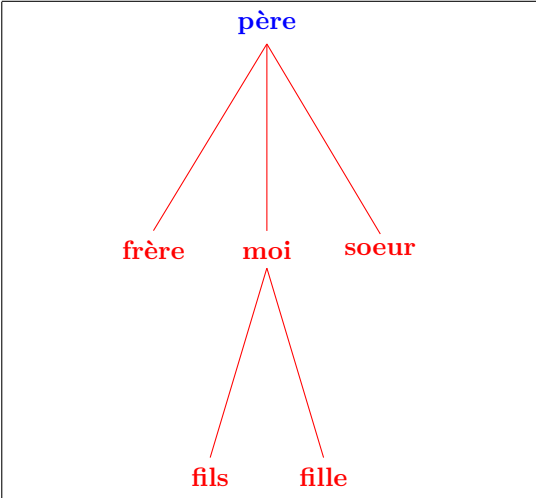
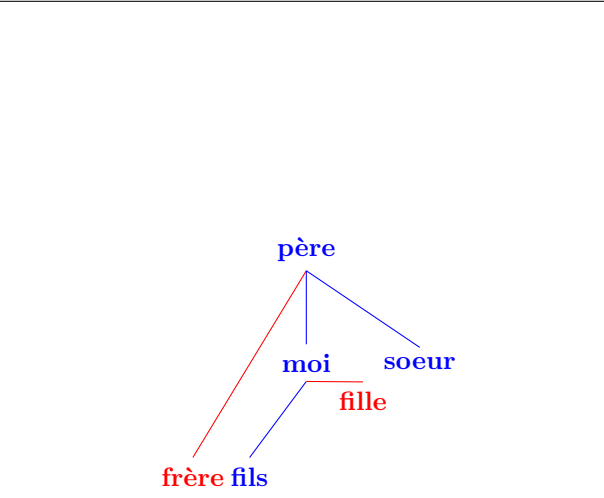


		
<code>\node {père}[grow=up]</code>	<code>\node {père}[grow=left]</code>	<code>\node {père}[grow=right]</code>
		
<code>\node {père}[grow=north]</code>	<code>\node {père}[grow=east]</code>	<code>\node {père}[grow=north east]</code>

	<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>
--	---

25.3 Distance

25.4 Parent-child distance

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

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

25.5 Two children distance

<code>\node {père}[sibling distance=1cm,red]</code>	<code>\node {père}[sibling distance=3cm,red]</code>
By default : 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>

25.6 Nodes customization

	<pre> \newcommand{\starburst}{\draw[red,starburst] (0,0) -- (1,1) -- (2,1) -- (2,0) -- (1,-1) -- (0,-1) -- (0,0);} \newcommand{\diamond}{\draw[red,diamond] (0,0) -- (1,1) -- (2,1) -- (2,0) -- (1,-1) -- (0,-1) -- (0,0);} \newcommand{\ellipse}{\draw[red,ellipse] (0,0) -- (1,1) -- (2,1) -- (2,0) -- (1,-1) -- (0,-1) -- (0,0);} \begin{tikzpicture} \node[starburst,draw] (père){père} child {node[diamond,draw] (frère){frère}} child {node[diamond,draw] (moi){moi}} child {node[ellipse,draw] (fils){fils}} child {node[ellipse,draw] (filles){filles}} child {node[diamond,draw] (soeur){soeur}}; \end{tikzpicture} </pre>
	<pre> \begin{tikzpicture} \node[rectangle,double,draw,text width=1cm,text centered] (père){père et mère} child {node[red,ultra thick,draw,rotate=45] (frère){frère}} child {node[blue,dashed,draw] (moi){moi}} child {node[ellipse,draw] (fils){fils}} child {node[ellipse,fill] (filles){filles}} child {node[magenta,pattern=dots,draw] (soeur){soeur}}; \end{tikzpicture} </pre>

25.6.1 Nodes name

	<pre> \begin{tikzpicture} \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); \end{tikzpicture} </pre>
--	--

¹ autres types de nœuds voir pages 71 ,74 ,76, etc

	<pre> \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); </pre>
--	--

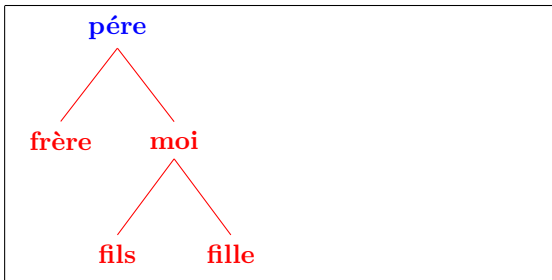
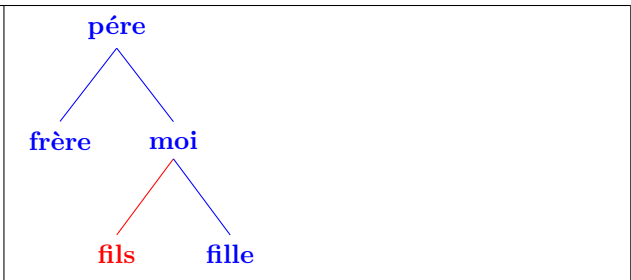
	<pre> \node (a) {père} child {node (b) {frère}} child {node (c) {moi}} child {node (d) {fils}} child {node (e) {fille}} child {node (f) {soeur}}; \draw[red,,ultra thick] (b) - (d); </pre>
--	--

25.6.2 Missing a node

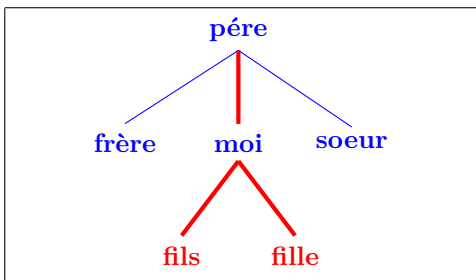
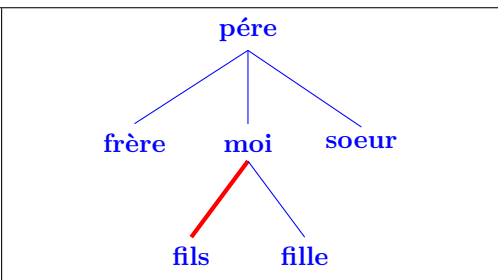
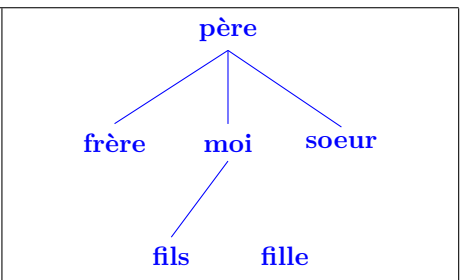
	<pre> child[missing] {node {4} } </pre>
--	---

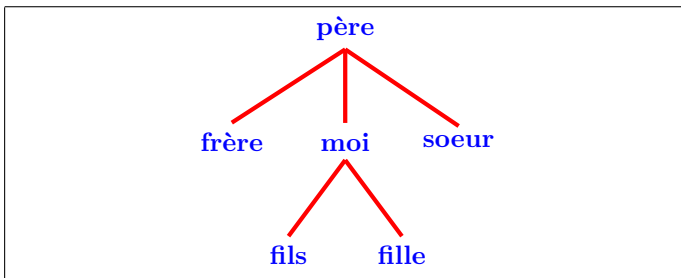
25.6.3 Attachment point modification

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

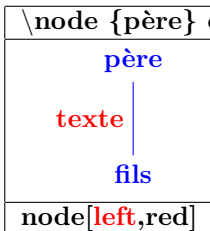
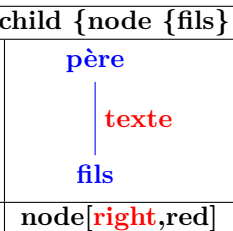
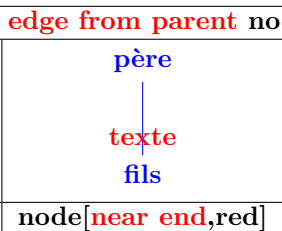
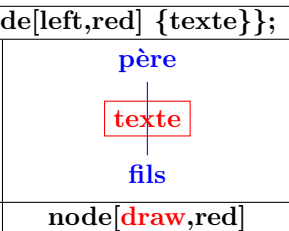
	
<pre>\node {père} [parent anchor=east,red] child {node {frère}} child { node {moi}} child {node {fils}} child {node {fils}} };</pre>	<pre>\node {père} child {node {frère}} child { node {moi}} child [parent anchor=west,red] {node {fils}} child {node {fils}} };</pre>

25.6.4 Links

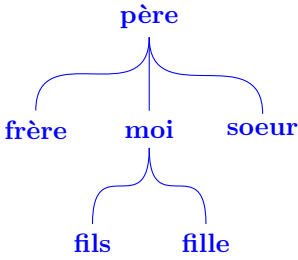
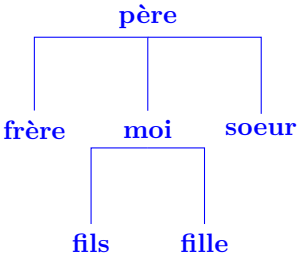
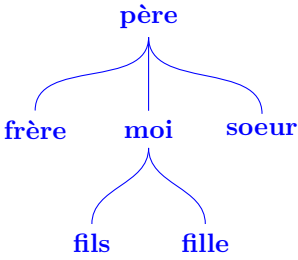
		
<pre>child {node {moi}} edge from parent[red,ultra thick]</pre>	<pre>child {node {fils}} edge from parent[red,ultra thick] }</pre>	<pre>child { node {fille}} edge from parent[draw=none] }</pre>


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

25.6.5 Labels on link

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

25.6.6 Links customization

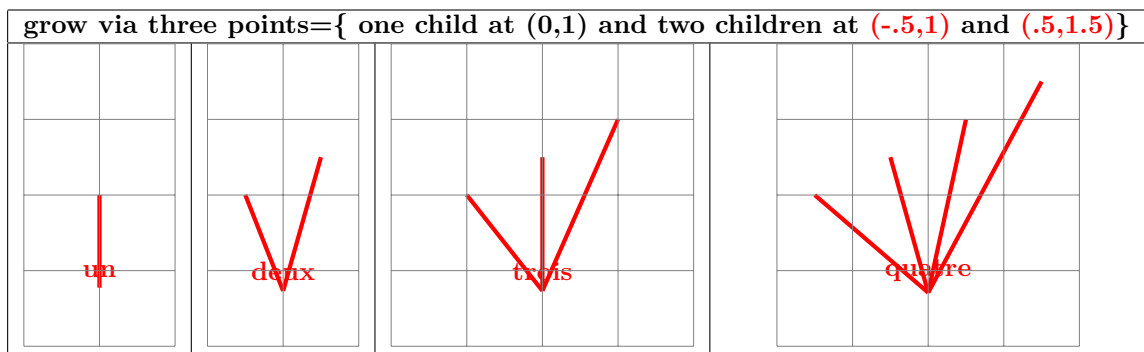
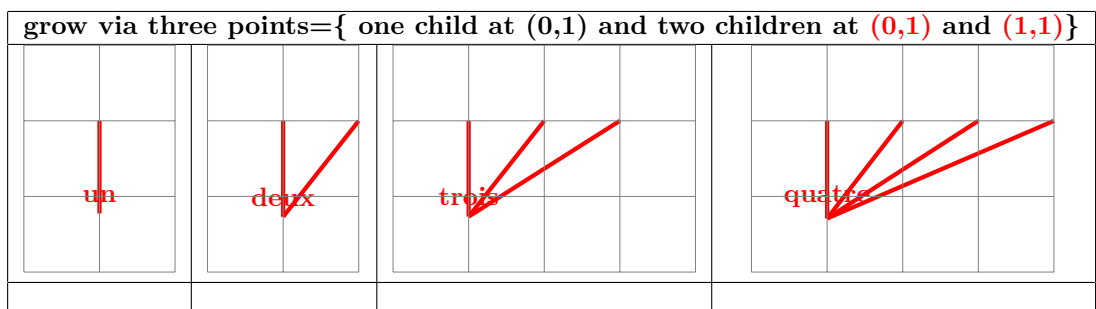
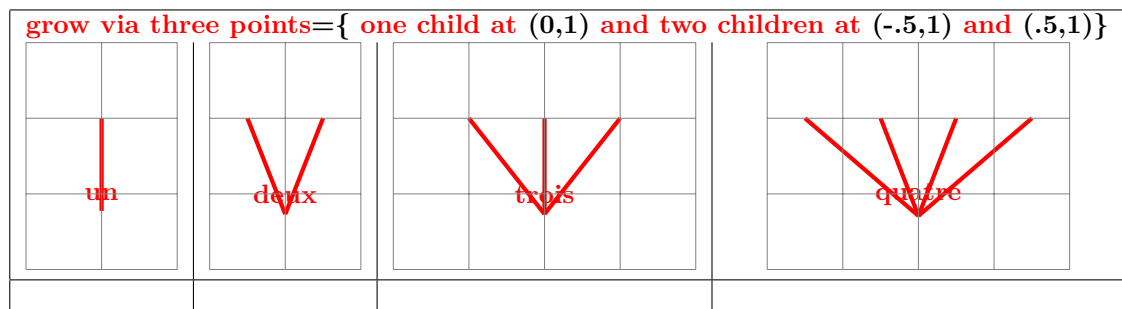
[edge from parent path= {(\tikzparentnode.south) .. controls +(0,-1) and +(0,1) .. (\tikzchildnode.north)}]		
		
.. controls +(0,-1) and +(0,1) .. voir liaison de noeuds label	-	to[in=90,out=-90]

25.7 More options with « library trees »

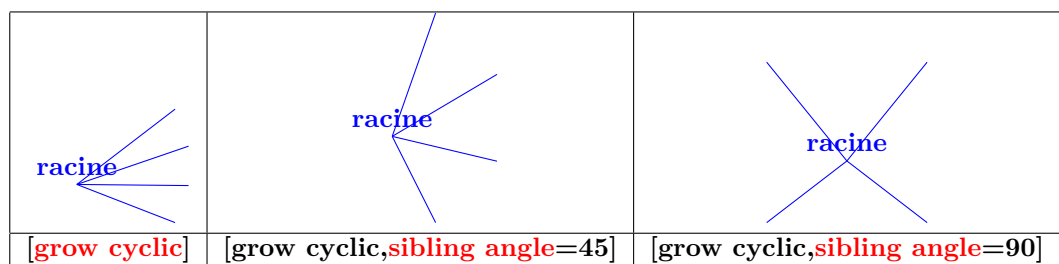
Load package : `\usetikzlibrary{trees}`

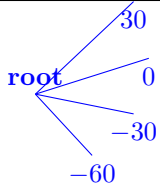
PGFmanual section : 72

25.7.1 one child and two childrenn position

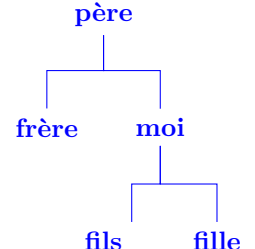


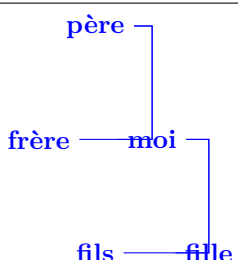
25.7.2 Angular linking

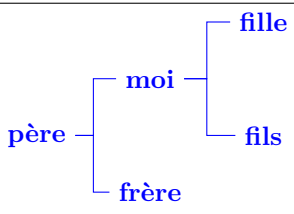


	<pre> \mode {racine} [clockwise from=30,sibling angle=30] child {node {\$30\$} } child {node {\$0\$} } child {node {\$-30\$} } child {node {\$-60\$} };</pre>
---	--

25.7.3 Forking links

	<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>
---	--

26 Animate a TikZ picture

Load package : `\usepackage{animate}`

26.1 Animation from picture files

first frame	second and last frame
	
<code>\includegraphics{XXX1}</code>	<code>\includegraphics{XXX2}</code>

<code>\animategraphics:</code>	
<code>[controls,</code>	<code>:Inserts control buttons</code>
<code>loop</code>	<code>:animation restarts automatically</code>
<code>autoplay]</code>	<code>:Start animation automatically</code>
<code>{4}</code>	<code>:4 frame per second</code>
<code>{XXX}</code>	<code>:file base name</code>
<code>{1}</code>	<code>:number of the first frame</code>
<code>{2}</code>	<code>:number of the last frame</code>

26.2 Animateinline

```

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

% first frame
\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}
% second frame
\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}

```

26.3 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}
```

The first letter of the variable name determines his 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}
```

27 Packages studied in this document

Basic TikZ package :

Load package : `\usepackage{tikz}`

Other packages




name		documentation ¹	
animate	147	animate.pdf	
tkz-tab	130	tkz-tab-screen.pdf	

Optional library :

name		Load package
angles	36	<code>\usetikzlibrary{angles}</code>
arrows.meta	20	<code>\usetikzlibrary{arrows.meta}</code>
bending	33	<code>\usetikzlibrary{bending}</code>
backgrounds	59	<code>\usetikzlibrary{backgrounds}</code>
calc	43	<code>\usetikzlibrary{calc}</code>
decorations.footprints	101	<code>\usetikzlibrary{decorations.footprints}</code>
decorations.fractals	108	<code>\usetikzlibrary{decorations.fractals}</code>
decorations.markings	98	<code>\usetikzlibrary{decorations.markings}</code>
decorations.pathmorphing	86	<code>\usetikzlibrary{decorations.pathmorphing}</code>
decorations.pathreplacing	92	<code>\usetikzlibrary{decorations.pathreplacing}</code>
decorations.shapes	102	<code>\usetikzlibrary{decorations.shapes}</code>
decorations.text	106	<code>\usetikzlibrary{decorations.text}</code>
fadings	64	<code>\usetikzlibrary{fadings}</code>
intersections	42	<code>\usetikzlibrary{intersections}</code>
patterns	16	<code>\usetikzlibrary{patterns}</code>
plotmarks	119	<code>\usetikzlibrary{plotmarks}</code>
scopes	56	<code>\usetikzlibrary{scopes}</code>
shadings	19	<code>\usetikzlibrary{shadings}</code>
shapes.arrows	76	<code>\usetikzlibrary{shapes.arrows}</code>
shapes.callouts	78	<code>\usetikzlibrary{shapes.callouts}</code>
shapes.geometric	71	<code>\usetikzlibrary{shapes.geometric}</code>
shapes.misc	80	<code>\usetikzlibrary{shapes.misc}</code>
shapes.multipart	82	<code>\usetikzlibrary{shapes.multipart}</code>
shapes.symbols	74	<code>\usetikzlibrary{shapes.symbols}</code>
trees	145	<code>\usetikzlibrary{trees}</code>

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calendar	PGFmanual section : 45
chains	PGFmanual section : 46
circuits.ee	PGFmanual section : 47-4
circuits.logic	PGFmanual section : 47-3
circular graph drawing library	PGFmanual section : 32
curvilinear library	PGFmanual section : 103-4-7
datavisualization library	PGFmanual section : 75
datavisualization.formats.functions library	PGFmanual section : 76-4
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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 

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