Diagramy v LaTeXu

Installfest

Ondřej Guth

FIT ČVUT

4. 3. 2012

Diagramy v LaTeXu
Installfest
Ondřej Guth
FIT ČVUT
4. 3. 2012

Zařazení

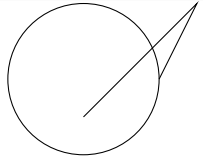
- balíček příkazů pro tvorbu obrázků přímo v LaTeXu
- nadstavba PGF (portable graphics format)
- využívá typografických možností LaTeXu (stejné písmo, velikosti apod.)

Zařazení
- balíček příkazů pro tvorbu obrázků přímo v LaTeXu
- nadstavba PGF (portable graphics format)
- využívá typografických možností LaTeXu (stejné písmo, velikosti apod.)

Vložení grafiky do dokumentu

simple.tex

```
This circle \tikz{\draw circle (5pt);}
has a diameter of 5\,pt.
\begin{tikzpicture}
\draw (-1,-1.5) -- (.5,0) -- (0,-1);
\draw (-1,-1) circle (1cm);
\end{tikzpicture}
```



This circle ○ has a diameter of 5 pt.

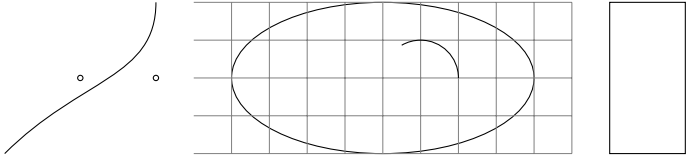
Vložení grafiky do dokumentu
simple.tex
This circle \tikz{\draw circle (5pt);}
has a diameter of 5\,pt.
\begin{tikzpicture}
\draw (-1,-1.5) -- (.5,0) -- (0,-1);
\draw (-1,-1) circle (1cm);
\end{tikzpicture}
This circle ○ has a diameter of 5 pt.

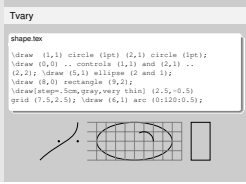
Je potřeba balíček „tikz“. Každý příkaz musí končit středníkem. Vždy určujeme cestu (obecně křivku). Příkaz „draw“ cestu vykreslí. Typicky určujeme souřadnice (implicitní jednotkou je centimetr) a co se s nimi má provést (mezi nimi může být např. úsečka nebo kružnice).

Tvary

shape.tex

```
\draw  (1,1) circle (1pt) (2,1) circle (1pt);
\draw (0,0) .. controls (1,1) and (2,1) ..
(2,2); \draw (5,1) ellipse (2 and 1);
\draw (8,0) rectangle (9,2);
\draw[step=.5cm,gray,very thin] (2.5,-0.5)
grid (7.5,2.5); \draw (6,1) arc (0:120:0.5);
```



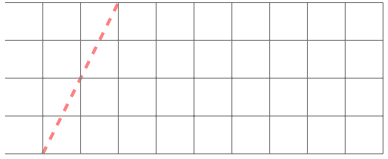


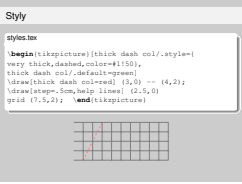
Bézierova křivka: (počátek) .. controls (první tečný bod) and (druhý tečný bod) .. (konec)

Styly

styles.tex

```
\begin{tikzpicture}[thick dash col/.style={
very thick,dashed,color=#1!50},
thick dash col/.default=green]
\draw[thick dash col=red] (3,0) -- (4,2);
\draw[step=.5cm,help lines] (2.5,0)
grid (7.5,2);  \end{tikzpicture}
```



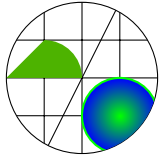


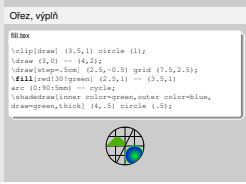
Styl lze nastavit globálně v rámci příkazu „tikzset“.

Ořez, výplň

fill.tex

```
\clip[draw] (3.5,1) circle (1);
\draw (3,0) -- (4,2);
\draw[step=.5cm] (2.5,-0.5) grid (7.5,2.5);
\fill[red!30!green] (2.5,1) -- (3.5,1)
arc (0:90:5mm) -- cycle;
\shadedraw[inner color=green,outer color=blue,
draw=green,thick] (4,.5) circle (.5);
```



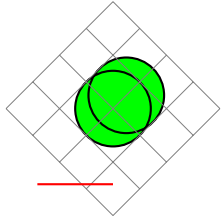


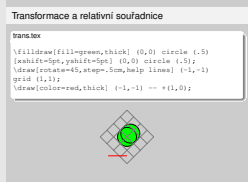
„clip“ použije cestu jako ořezávací; je-li parametrem „draw“, dojde zároveň k vykreslení. „cycle“ slouží k uzavření cesty.

Transformace a relativní souřadnice

trans.tex

```
\filldraw[fill=green,thick] (0,0) circle (.5)
[xshift=5pt,yshift=5pt] (0,0) circle (.5);
\draw[rotate=45,step=.5cm,help lines] (-1,-1)
grid (1,1);
\draw[color=red,thick] (-1,-1) -- +(1,0);
```

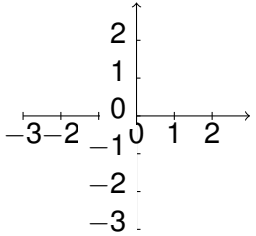




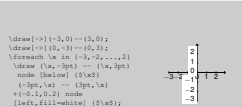
Další:scale, xslant a yslant.

Opakování

```
\draw[->](-3,0)--(3,0);
\draw[->](0,-3)--(0,3);
\foreach \x in {-3,-2,...,2}
 \draw (\x,-3pt) -- (\x,3pt)
  node [below] {$\x$}
  (-3pt,\x) -- (3pt,\x)
 +(-0.1,0.2) node
 [left,fill=white] {$\x$};
```



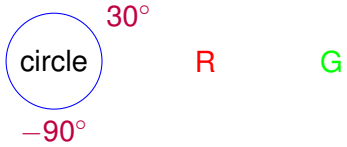
Opakování

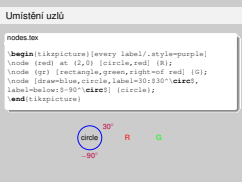


Umístění uzlů

nodes.tex

```
\begin{tikzpicture}[every label/.style=purple]
\node (red) at (2,0) [circle,red] {R};
\node (gr) [rectangle,green,right=of red] {G};
\node [draw=blue,circle,label=30:$30^\circ$,
label=below:$-90^\circ$] {circle};
\end{tikzpicture}
```





Pod uzlem=below.

Hrany

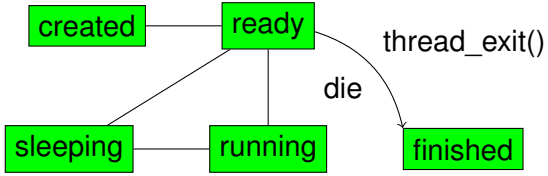
```
\begin{tikzpicture}[auto,every node/.style={
draw,ellipse,fill=green},
trans/.style={draw=none,fill=none}]
\node (enter) at (0,0) {created};
\node (ready) [right=of enter] {ready};
\node (run) [below=of ready] {running};
\node (sleep) [left=of run] {sleeping};
\node (dead) [right=of run] {finished};
\draw (enter) to (ready) to (run) to (sleep)
to (ready); \draw [->] (ready) to
[bend left=30] node[trans] {thread\_exit()}
node[trans,swap] {die} (dead.north west);
\end{tikzpicture}
```


Hrany

\begin{tikzpicture}[auto,every node/.style={
draw,ellipse,fill=green},
trans/.style={draw=none,fill=none}]
\node (enter) at (0,0) {created};
\node (ready) [right=of enter] {ready};
\node (run) [below=of ready] {running};
\node (sleep) [left=of run] {sleeping};
\node (dead) [right=of run] {finished};
\draw (enter) to (ready) to (run) to (sleep)
to (ready); \draw [->] (ready) to
[bend left=30] node[trans] {thread_exit()}
node[trans,swap] {die} (dead.north west);
\end{tikzpicture}

„auto“: automatické umístění popisků k hraně. „bend“ – úhel zakřivení.

Hrany


created
ready
thread_exit()
die
sleeping
running
finished

Hrany


created
ready
thread_exit()
die
sleeping
running
finished

Automaty

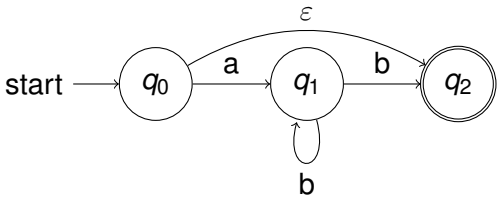
automaton.tex

```
\begin{tikzpicture}[auto,node distance=2cm]
\node[state,initial] (q_0) {$q_0$};
\node[state] (q_1) [right of=q_0] {$q_1$};
\node[state,accepting] (q_2) [right of=q_1]
{$q_2$};
\path[->] (q_0) edge node {a} (q_1);
\path[->] (q_1) edge node {b} (q_2)
(q_1) edge [loop below] node {b} ()
(q_0) edge [bend left] node {$\varepsilon$}
(q_2);
\end{tikzpicture}
```


Automaty
automaton.tex
\begin{tikzpicture}[auto,node distance=2cm]
\node[state,initial] (q_0) {q_0};
\node[state] (q_1) [right of=q_0] {q_1};
\node[state,accepting] (q_2) [right of=q_1]
{q_2};
\path[->] (q_0) edge node {a} (q_1);
\path[->] (q_1) edge node {b} (q_2)
(q_1) edge [loop below] node {b} ()
(q_0) edge [bend left] node {ε}
(q_2);
\end{tikzpicture}

usetikzlibrary: positioning,automata

Automaty



Automaty