

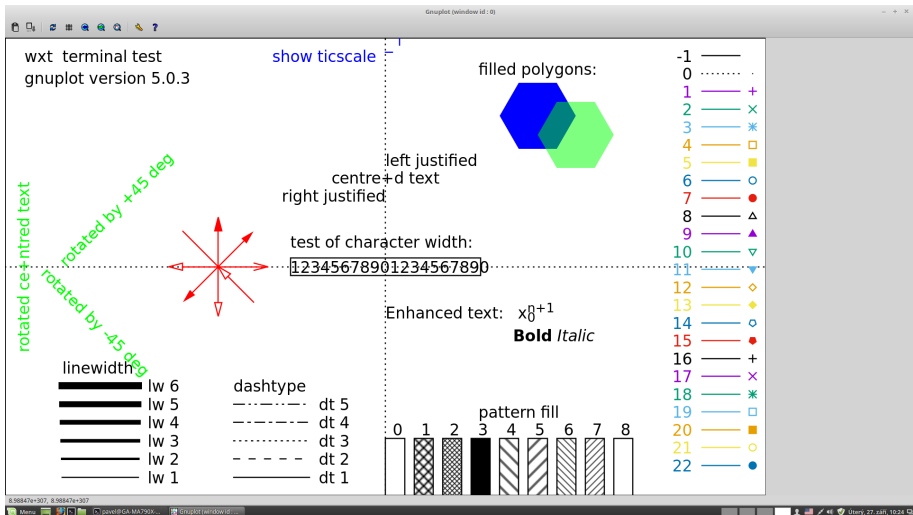
# Programy

- Gnuplot
- $\text{\LaTeX}$
- $\text{\LaTeX}$ -TikZ

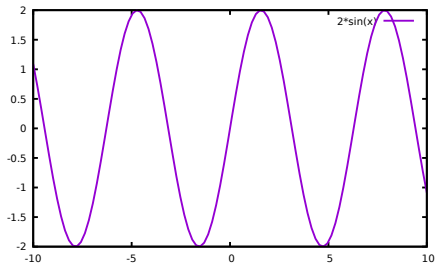
# Gnuplot

- hlavní stránka: [www.gnuplot.info](http://www.gnuplot.info)
- dokumentace: [www.gnuplot.info/documentation.html](http://www.gnuplot.info/documentation.html)
- příklady: [gnuplot.sourceforge.net/demo\\_5.2/](http://gnuplot.sourceforge.net/demo_5.2/)
- matematické funkce
- experimentální data

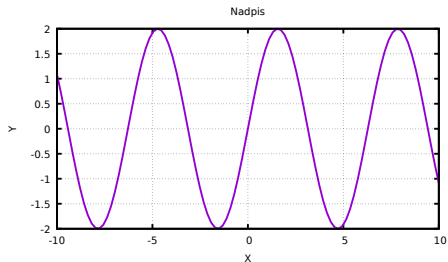
# Příkaz - test



```
#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,12"
set terminal pdfcairo linewidth 3
set output "test.pdf"
plot 2*sin(x)
```



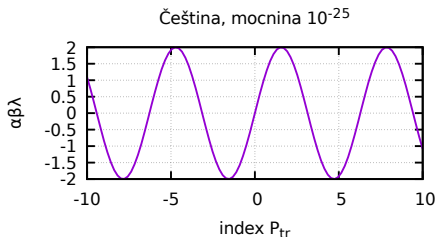
```
#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,12"
set terminal pdfcairo linewidth 3
set output "test.pdf"
unset key
set grid
set title "Nadpis"
set xlabel "X"
set ylabel "Y"
plot 2*sin(x)
```



```

#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,20"
set terminal pdfcairo linewidth 3
set output "test.pdf"
unset key
set grid
set title "Čeština, mocnina 10^{-25}"
set xlabel "index P_{tr}"
set ylabel "{ /Symbol abl }"
plot 2*sin(x)

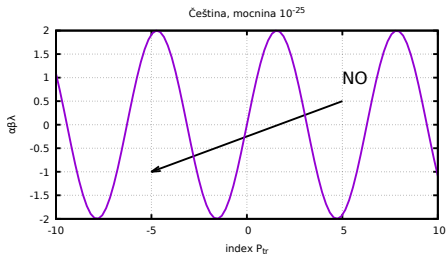
```



```

#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,12"
set terminal pdfcairo linewidth 3
set output "test.pdf"
unset key
set grid
set label "NO" at 5,1 font "Helvetica,20"
set arrow from 5,0.5 to -5,-1
set title "Čeština, mocnina 10-25"
set xlabel "index Ptr"
set ylabel "{ /Symbol abl }"
plot 2*sin(x)

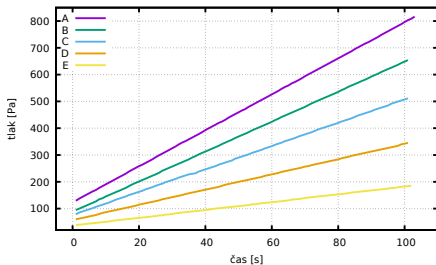
```



```

#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,12"
set terminal pdfcairo linewidth 3
set output "test.pdf"
set grid
set xlabel "čas [s]"
set ylabel "tlak [Pa]"
set key left
set xrange [-5:110]
set yrange [20:850]
plot "VAKP5-01.DAT" using ($1):($2*133.2) title "A" with
lines,/
"VAKP5-02.DAT" using ($1):($2*133.2) title "B" with lines,/
"VAKP5-03.DAT" using ($1):($2*133.2) title "C" with lines,/
"VAKP5-04.DAT" using ($1):($2*133.2) title "D" with lines,/
"VAKP5-05.DAT" u ($1):($2*133.2) t "E" w l

```



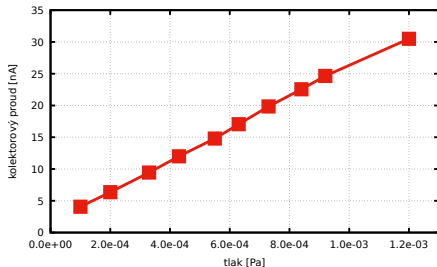


```

#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,20"
set terminal pdfcairo linewidth 3
set output "test.pdf"
unset key
set xlabel "tlak [Pa]"
set ylabel "kolektorový proud [nA]"
set format x "%.1e"
le = 0.5e-3 #proud elektronu [A]

plot 'ion1.dat' using ($!*$100):($!*le*1000000000) w lp pt 5 ps
1.5 lt 7 lw 1.5

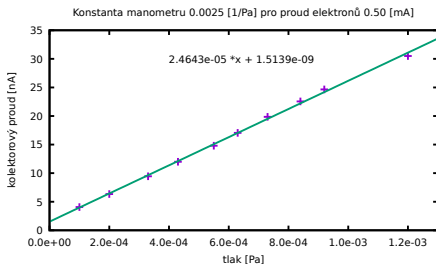
```



```

set xlabel "tlak [Pa]"
set ylabel "kolektorový proud [nA]"
unset key
set xrange [0:0.0013]
set format x "%.1e"
le = 0.5e-3
lin1(x) = a1*x+b1
a1=1
b1=1
fit lin1(x) 'ion1.dat' using ($1*100):($2*le) via a1,b1
set title sprintf("Konstanta manometru %.4f [1/Pa] pro proud
elektronů %.2f [mA]", a1*100, le*1000)
set label sprintf("%.4e *x + %.4e", K, b1) at 0.0004, 30
plot 'ion1.dat' using ($1*100):($2*le*1000000000) w p,
lin1(x)*1000000000

```



- hlavní stránka: [www.latex-project.org/](http://www.latex-project.org/)
- dokumentace: [www.latex-project.org/help/documentation/](http://www.latex-project.org/help/documentation/)  
J. Rybička: L<sup>A</sup>T<sub>E</sub>X pro začátečníky, Konvoj 1995
- příklady: internet, dokumentace, ...
- článek, kniha, DP, BP, skripta, poster, přednáška, protokoly, ...
- integrovaná prostředí - TeXstudio, TeXmaker,...
- formát obrázků - png, jpg, eps, pdf

# Texstudio

The screenshot displays the Texstudio application window. The left pane shows the LaTeX source code for a document named 'praktikum-02a-programy.tex'. The code includes a preamble with `\input{hlavicka.tex}`, followed by a `\begin{document}` block. Inside, there are three `\frame` environments. The first frame contains a `\begin{itemize}` list with items `\item Gnuplot`, `\item \LaTeX`, and `\item \LaTeX-TikZ`. The second frame contains a `\begin{itemize}` list with links: `\item hlavní stránka: www.gnuplot.info`, `\item dokumentace: www.gnuplot.info/documentation.html`, and `\item příklady: gnuplot.sourceforge.net/demo\ 5.0/`. The third frame contains a `\begin{columns}` environment with two `\begin{column}` blocks, each containing the text 'test'. The right pane shows the rendered PDF of the document. The title 'Programy' is centered at the top. Below it is a bulleted list: 

- Gnuplot
- $\LaTeX$
- $\LaTeX$ -TikZ

The footer of the PDF contains 'PRAKTIKUM Z VAKUOVÉ FYZIKY' and '1 / 5'. The status bar at the bottom of the window shows 'Pages 1 to 3 of 5', '185%' zoom, and the system tray with the date 'Úterý 27. září 10:12'.

The screenshot displays the TeXstudio interface. The main editor window on the left contains the following LaTeX source code:

```
\documentclass[12pt]{article}
\begin{document}
Test
\end{document}
```

The status bar at the bottom of the editor indicates "Line: 1 Column: 0 INSERT".

The right-hand pane shows the rendered PDF output, which contains the word "Test" centered on the page.

At the bottom of the TeXstudio window, a Messages panel shows the following log entry:

```
Process started: pdflatex -synctex=1 -interaction=nonstopmode "test".tex
Process exited normally
```

The bottom status bar of the application shows "Page 1 of 1 349%", "cs\_CZ", "UTF-8", "Ready", and "Automatic".

The screenshot shows the TeXstudio interface. The main editor window contains the following LaTeX code:

```
\documentclass[12pt]{article}
\usepackage[utf8]{inputenc}
\usepackage[czech]{babel}

\pagestyle{empty}
\topmargin -1cm
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\begin{document}

Test češtiny.

Test  $\lambda$ ;  $T^P$ ;  $T_{mn}$ 

\end{document}
```

The preview window on the right displays the rendered output:

Test češtiny.  
Test  $\lambda$ ;  $T^P$ ;  $T_{mn}$

At the bottom, a Messages window shows the following output:

```
Process started: pdflatex -synctex=1 -interaction=nonstopmode "test.tex"
Process exited normally
```

The status bar at the bottom right indicates: Page 1 of 1, 349%, cs\_CZ, UTF-8, Ready, Automatic, and the system tray shows the date and time: Pátek, 30. září, 12:45.

TeXstudio interface showing LaTeX source code and a preview window.

**Source Code (test.tex):**

```
\documentclass[12pt]{article}
\usepackage[utf8]{inputenc}
\usepackage[czech]{babel}

\pagestyle{empty}
\topmargin -1cm
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\begin{document}
\begin{center}
Test  $\lambda$ ;  $T^P$ ;  $T_{mn}$ 
\end{center}


$$v_a = \sqrt{\frac{4}{\pi}} v_p = \sqrt{\frac{8kT}{\pi m_0}}$$


\begin{equation}
v_a = \sqrt{\frac{4}{\pi}} v_p = \sqrt{\frac{8kT}{\pi m_0}}
\end{equation}

\end{document}
```

**Preview Window:**

Test  $\lambda$ ;  $T^P$ ;  $T_{mn}$

$$v_a = \sqrt{\frac{4}{\pi}} v_p = \sqrt{\frac{8kT}{\pi m_0}}$$
$$v_a = \sqrt{\frac{4}{\pi}} v_p = \sqrt{\frac{8kT}{\pi m_0}} \quad (1)$$

Messages: Process started: pdflatex -synctex=1 -interaction=nonstopmode "test".tex  
Process exited normally

Page 1 of 1 200%

TeXstudio interface showing LaTeX code and a plot.

```
\documentclass[12pt]{article}
\usepackage[utf8]{inputenc}
\usepackage[czech]{babel}

\usepackage{graphicx}

\pagestyle{empty}
\topmargin -1cm
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\begin{document}

\includegraphics[width=0.8\textwidth]{v-boltz-01.pdf}

\end{document}
```

Line: 17 Column: 0 INSERT

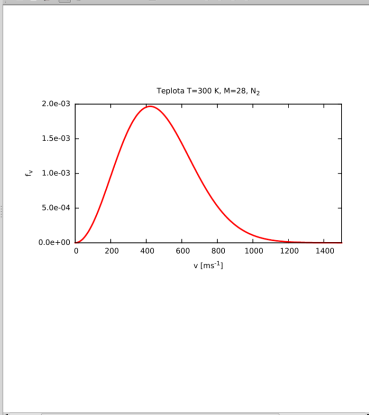
Messages Log Preview Search Results

Process started: pdflatex -synctex=1 -interaction=nonstopmode "test".tex

Process exited normally

Page 1 of 1 141%

cs\_CZ UTF-8 Ready Automatic Pátek, 30. září, 13:52





`\usepackage{graphicx}`  
`\pagestyle{empty}`  
`\topmargin -1cm`  
`\oddsidemargin -0.6cm`  
`\textheight 24cm`  
`\textwidth 16.5cm`  
`\begin{document}`  
 Text Obr.\ref{m1} text pokračuje.  
`\begin{figure}[!htb]`  
`\begin{center}`  
`\includegraphics[width= 0.8\textwidth]{v-boltz-01.pdf}`  
`\end{center}`  
`\caption{\em Maxwellovo rozdělení rychlostí pro dusík a`  
`teplotu 300 K }`  
`\label{m1}`  
`\end{figure}`  
`\end{document}`

Text Obr.1 text pokračuje.

Teplota  $T=300\text{ K}$ ,  $M=28, N_2$

Obrázek 1: Maxwellovo rozdělení rychlostí pro dusík a teplotu 300 K

Messages Log Preview Search Results X  
 Process started: pdflatex -synctex=1 -interaction=nonstopmode "test.tex"  
 Process exited normally

Page 1 of 1 141%  
 cs\_CZ UTF-8 Ready Automatic Pátek, 30. září, 12:54

`\begin{document}`  
`\begin{table}![ht]`  
`\begin{center}`  
`\begin{tabular}{|c|cccc|}`  
`\hline`  
`Plyn & $He$ & $Ne$ & $Ar$ & $Kr$ \\\`  
`\hline`  
`$d-[10^{-10}]m$ & 2,20 & 2,55 & 3,69 & 4,27 \\\`  
`\hline`  
`\end{tabular}`  
`\end{center}`  
`\caption{\em Efektivní průměr některých atomů a molekul}`  
`\label{prumer}`  
`\end{table}`  
`\end{document}`

Plyn	<i>He</i>	<i>Ne</i>	<i>Ar</i>	<i>Kr</i>
$d [10^{-10} m]$	2,20	2,55	3,69	4,27

Tabulka 1: *Efektivní průměr některých atomů a molekul*

Line: 17 Column: 30 INSERT

Messages Log Preview Search Results

Process started: pdflatex -synctex=1 -interaction=nonstopmode "test.tex"

Process exited normally

Page 1 of 1 200%

cs\_CZ UTF-8 Ready Automatic

Pátek, 30. září, 13:59

Bez názvu - TeXstudio

Soubor Úpravy Jazyk Nástroje LaTeX Matematika Průvodce Bibliografie Mapa Dohled Volby Nápověda

Střek Label ( GRC ) Drobně - Jiny

```

\documentclass[12pt]{article}
\begin{document}
\renewcommand{\arraystretch}{1.5}
\begin{tabular}{|c|c|c|c|c|}
\hline
\bf plyn & He & Ne & Ar & Kr \\
\hline
\boldmath $d-[10^{*-10}]\text{-}\rm m$ & 2,20 & 2,55 & 3,69 & 4,27 \\
\hline
\end{tabular}
\renewcommand{\arraystretch}{1}
\end{document}

```

plyn	He	Ne	Ar	Kr
$d [10^{-10} \text{ m}]$	2,20	2,55	3,69	4,27

Rádek: 11 Sloupec: 0 Režim: Vložit

Zprávy Zknam Náhled Výsledky hledání

Proces spuštěn: pdflatex -synctex=1 -interaction=nonstopmode "texstudio\_P4rC".tex  
 Proces ukončen jako obvykle

Strana 1 z 1 169%

cs\_CZ UTF-8 Pípraven Automaticky

Streda, 10. zari, 9:55 AM

The screenshot displays the TeXstudio interface. The main editor window shows the following LaTeX source code:

```
\topmargin -1cm
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\usepackage{color}

\begin{document}
\begin{center}
{\tiny Test}\\
{\scriptsize Test}\\
{\footnotesize Test}\\
{\small Test}\\
{\normalsize Test}\\
{\large Test}\\
{\Large Test}\\
{\huge Test}\\
{\Huge Test}\\

{\color{red} Test}
\end{center}
\end{document}
```

The right-hand pane shows the rendered output of this code, featuring the word "Test" in various sizes and a red "Test" at the bottom. The status bar at the bottom of the window indicates "Page 1 of 1" and "400%". A messages window at the bottom left shows the following text:

```
Messages Log Preview Search Results
Process started: pdflatex -synctex=1 -interaction=nonstopmode "test".tex
Process exited normally
```

The screenshot shows the TeXstudio interface. The left pane displays the LaTeX source code for a document. The code is as follows:

```
\textwidth 16.5cm
\usepackage{color}
\begin{document}
\begin{itemize}
\item Test A
\item Test B
\end{itemize}
%-----
\begin{enumerate}
\item Test A
\item Test B
\end{enumerate}
\end{document}
```

The right pane shows the rendered output of the document, which is a white page with the following content:

- Test A
- Test B

Below the rendered page, there is an ordered list:

1. Test A
2. Test B

The status bar at the bottom of the TeXstudio window indicates "Page 1 of 1" and "400%". The system tray at the very bottom shows the date and time as "Pátek, 30. září, 16:59".

The screenshot shows the TeXstudio interface with a LaTeX source file on the left and its rendered PDF on the right. The source code includes page dimensions, a document structure, and a bibliography section. The rendered output shows the text and a list of references.

```
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\begin{document}

Text \cite{test1}, text text \cite{test2}.

\begin{thebibliography}{99}
\bibitem{test1} J. Groszkowski: Technika
vysokého vakua, SNTL, Praha 1981
\bibitem{test2} L. Pátý: Fyzika nízkých tlaků,
Academia, Praha 1968
\end{thebibliography}
\end{document}
```

Text [1], text text [2].

## Reference

- [1] J. Groszkowski: Technika vysokého vakua, SNTL, Praha 1981
- [2] L. Pátý: Fyzika nízkých tlaků, Academia, Praha 1968

Line: 13 Column: 0 INSERT

Messages Log Preview Search Results

Process started: pdflatex -synctex=1 -interaction=nonstopmode "test.tex"

Process exited normally

Page 1 of 1 165%

cs\_CZ UTF-8 Ready Automatic

Pátek, 30. září, 16:29

# L<sup>A</sup>T<sub>E</sub>X- TikZ

- hlavní stránka: [www.ctan.org/pkg/pgf](http://www.ctan.org/pkg/pgf)
- dokumentace: [www.ctan.org/pkg/pgf](http://www.ctan.org/pkg/pgf)
- příklady: [www.texample.net/tikz/examples/](http://www.texample.net/tikz/examples/)
- schémata

TeXstudio interface showing a LaTeX document titled "test.tex". The document content is as follows:

```
\oddsidemargin -0.6cm
\textheight 24cm
\textwidth 16.5cm

\usepackage{tikz}
\begin{document}

\begin{tikzpicture}[ultra thick]
\draw (2,4) rectangle (6,2);
\draw (0,0) circle (2);
\draw [fill = magenta, draw = blue] (0,0) circle (1);
\node at (-1,-3) {\bf \textsf{CCD}};
\draw [->, > = stealth] (4,-3)--(6,1.5);
\draw (-1,-5)--(2,-5)--(3,0)--(3.5,0)--(2,2);
\end{tikzpicture}
```

The rendered output shows a diagram with a magenta circle inside a blue circle, labeled "CCD". A speech bubble points to the magenta circle, and a large arrow points from the bottom right towards the diagram.

Messages Log Preview Search Results

Process started: pdflatex -synctex=1 -interaction=nonstopmode "test".tex

Process exited normally

Page 1 of 1 231%

cs\_CZ UTF-8 Ready Automatic

Menu



