

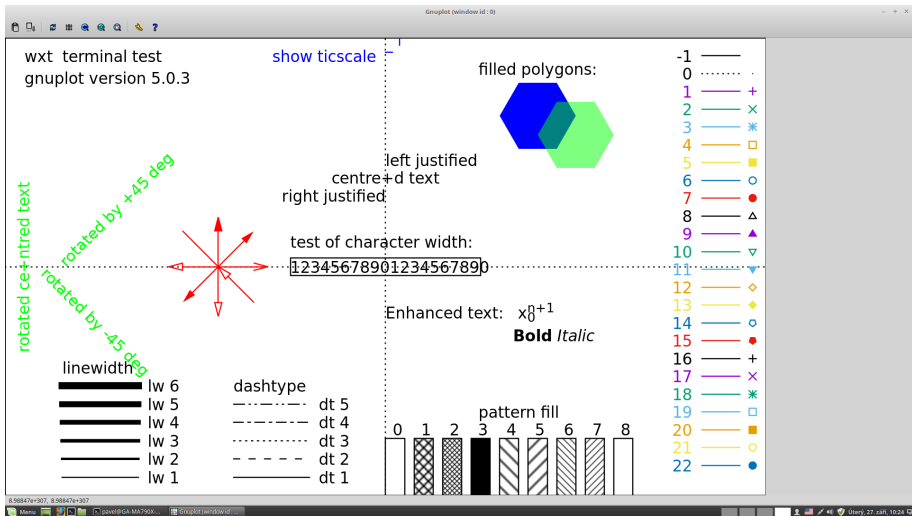
Programy

- Gnuplot
- \LaTeX
- \LaTeX -TikZ

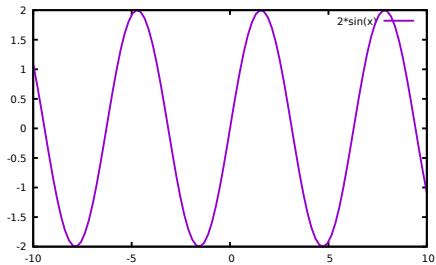
Gnuplot

- hlavní stránka: www.gnuplot.info
- dokumentace: www.gnuplot.info/documentation.html
- příklady: gnuplot.sourceforge.net/demo_5.2/
- matematické funkce
- experimentální data

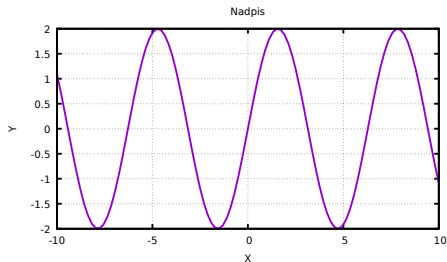
Příkaz - test



```
#!/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)
```



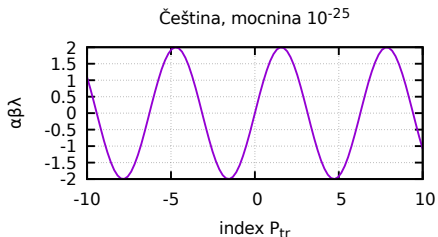
```
#!/usr/bin/gnuplot -persist
set terminal pdfcairo enhanced color solid
set terminal pdfcairo font "Helvetica,12"
set terminal pdfcairo linewidth 3
set output "test.pdf"
unset key
set grid
set title "Nadpis"
set xlabel "X"
set ylabel "Y"
plot 2*sin(x)
```



```

#!/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)

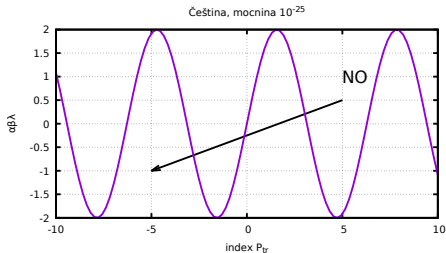
```



```

#!/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)

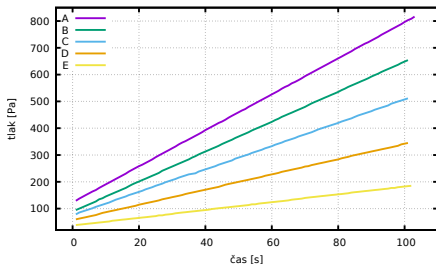
```



```

#!/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

```

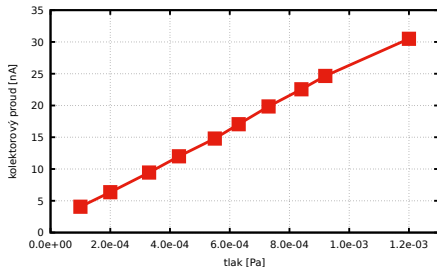



```

#!/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 ($1*100):($2*le*1000000000) w lp pt 5 ps
1.5 lt 7 lw 1.5

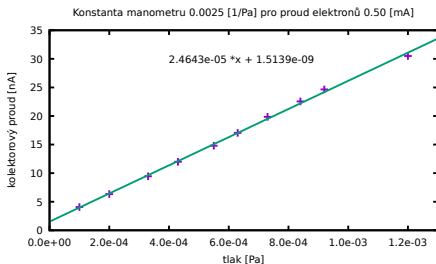
```



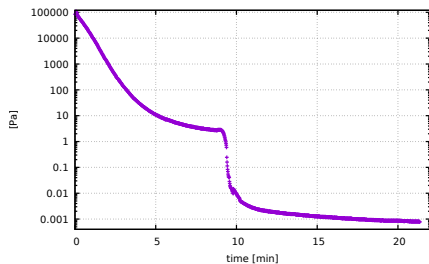
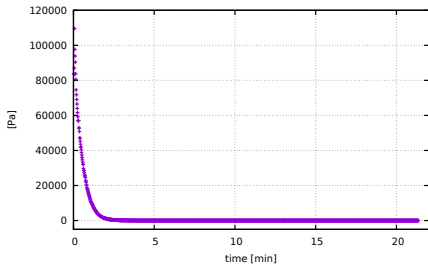
```

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

```



set logscale y



- hlavní stránka: www.latex-project.org/
- dokumentace: www.latex-project.org/help/documentation/
J. Rybička: L^AT_EX 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 titled "praktikum-02a-programy.tex". The code includes an `\input` command for "hlavicka.tex", a `\begin{document}` block, and a `\frame` command to create a header box containing the title "Programy" and a bulleted list of topics: Gnuplot, \LaTeX , and \LaTeX -TikZ. A second `\frame` command creates a box with links to Gnuplot resources. A `\frameof` command is used to create a footer box with the text "PRAKTIKUM Z VAKUOVÉ FYZIKY". The right pane shows the rendered PDF output, which matches the visual structure of the source code. The footer of the PDF reads "PRAKTIKUM Z VAKUOVÉ FYZIKY" and "1 / 5". The status bar at the bottom indicates "Pages 1 to 3 of 5" and "185%".

```

\input{hlavicka.tex}

\begin{document}
\frame{
  \nabla{Programy}

  \begin{itemize}
    \item Gnuplot
    \item  $\LaTeX$ 
    \item  $\LaTeX$ -TikZ
  \end{itemize}
}

\frame{
  \nabla{Gnuplot}

  \begin{itemize}
    \item hlavní stránka: www.gnuplot.info
    \item dokumentace: www.gnuplot.info/documentation.html
    \item příklady: gnuplot.sourceforge.net/demo\ 5.0/
  \end{itemize}
}

\frameof
\begin{columns}
  \begin{column}{0.5\textwidth}
    test
  \end{column}
  \begin{column}{0.5\textwidth}
    test
  \end{column}
\end{columns}
\end{document}

```

Line: 64 Column: 0 INSERT

Messages Log Preview Search Results

Process started: pdflatex -synctex=1 -interaction=nonstopmode "praktikum-02a-programy".tex
Process exited normally

Pages 1 to 3 of 5 185%

cs_CZ UTF-8 Ready Automatic

Uterý 27. září 10:12

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

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

The right-hand pane shows the rendered output of this code, which is a single page with the word "Test" centered on it. The status bar at the bottom of the TeXstudio window indicates "Page 1 of 1" and "349%".

At the bottom of the image, there is a Windows taskbar showing the system tray with the date and time: "Pátek, 30. září, 12:41".

The screenshot shows the TeXstudio interface. The main editor window displays 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 shows the rendered output:

Test češtiny.
Test λ ; T^P ; T_{mn}

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

```
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 for a document and its rendered output.

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}
```

Rendered Output:

Test λ ; 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

TeXstudio interface showing a LaTeX document and its rendered output.

Left Panel (Source Code):

```

\usepackage{graphicx}

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

\begin{document}

Text Obr.\ref{m1} text pokračuje.

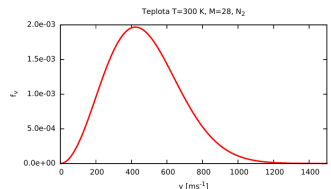
\begin{figure}[!htb]
  \begin{center}
    \includegraphics[width= 0.8\textwidth]{v-boltz-01.pdf}
  \end{center}
  \caption{\em Maxwellovo rozdělení rychlostí pro dusík a
    teplotu 300 K }
  \label{m1}
\end{figure}

\end{document}

```

Right Panel (Rendered Output):

Text Obr.1 text pokračuje.



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

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, 13:54

TeXstudio interface showing a LaTeX document and its rendered output.

Left Panel (Source Code):

```

\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}

```

Right Panel (Rendered Output):

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*

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 Jazyky Nástroje LaTeX Matematika Průvodce Bibliografie Mapa Dohled Volby Nápověda

Střek Label(GIKC) 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 Peřim: Vnoit

Zprávy Zřznam Náhled Výsledky hledání

Proces spuřten: pdflatex -synctex=1 -interaction=nonstopmode "texstudio_PuAprC".tex

Proces ukončen jako obvykle

Strana 1 z 1 169%

cs_CZ UTF-8 Připraven Automaticky

Středa, 10. zari, 9:55

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 bottom of the screen shows the date and time as "Pátek, 30. září, 16:59".

The screenshot displays the TeXstudio interface. The left pane shows the LaTeX source code for a document. The right pane shows the rendered PDF output. The status bar at the bottom indicates the current page is 1 of 1 at 165% zoom.

```
\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^AT_EX- TikZ

- hlavní stránka: www.ctan.org/pkg/pgf
- dokumentace: www.ctan.org/pkg/pgf
- příklady: www.texample.net/tikz/examples/
- schémata

Diagram illustrating the TeXstudio interface showing the source code for a TikZ diagram of a CCD sensor and its rendered output.

```
\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 diagram shows a magenta circle with a blue outline, representing a pixel, enclosed within a larger black circle. To the right, a black rectangle is connected to the main diagram by a line that forms a speech bubble shape. An arrow points from the bottom of this shape towards the right. The text "CCD" is written below the central circle.

