

Maxiplot: Maxima and Gnuplot in L^AT_EX.

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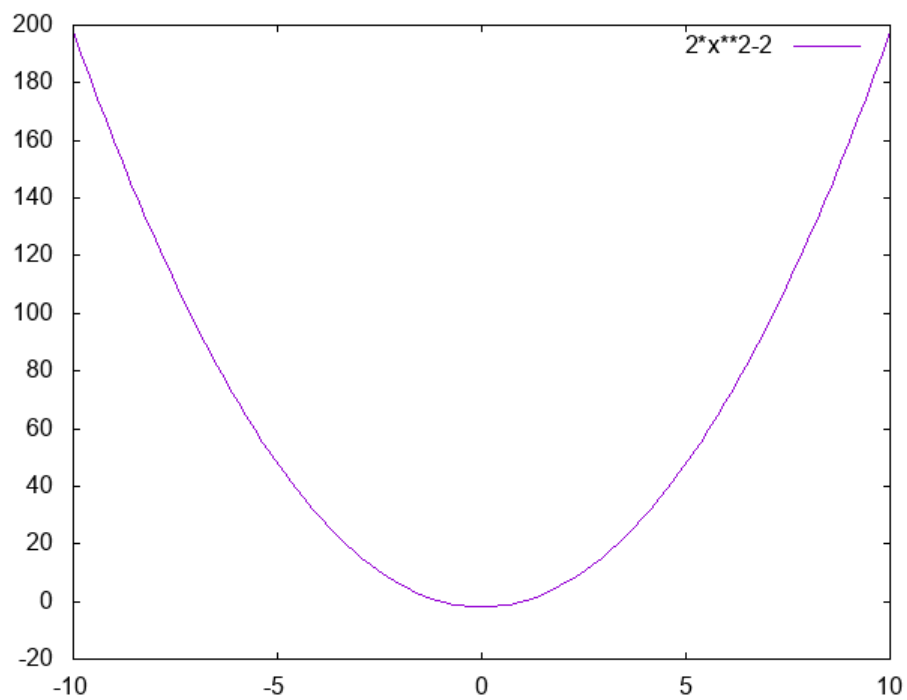
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1 Gnuplot

Med *Maxima* er det nemt at benytte CAS. Hvis man vil have en nem mulighed for at behandle grafiske udtryk er *Gnuplot* en mulighed. Eksemplerne herunder vil benytte muligheden for at integrere *Gnuplot* til at tegne grafer. Det vil være sådan at *Gnuplot* vil oprette en billedfil (png) som vil blive integreret i L^AT_EX-dokumentet med komandoen: *mxpIncludegraphics*. Derfor skal du altid huske at typesætte to gange for at processen bliver helt færdig.

1.1 Parabel

```
\begin{gnuplot}
set term png
set output "parable.png"
plot 2*x**2-2
\end{gnuplot}
\begin{center}
  \mxpIncludegraphics[scale=0.75]{parable.png}
\end{center}
```

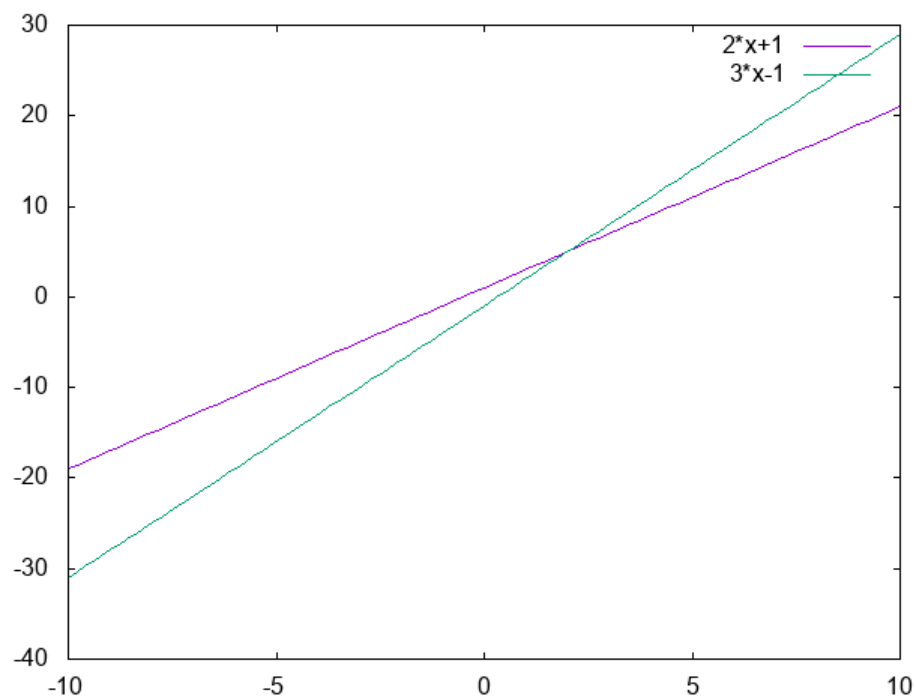


1.2 To linier

```

\begin{gnuplot}
set term png
set output "lines.png"
plot 2*x+1,3*x-1
\end{gnuplot}
\begin{center}
  \mxiIncludegraphics[scale=0.75]{lines.png}
\end{center}

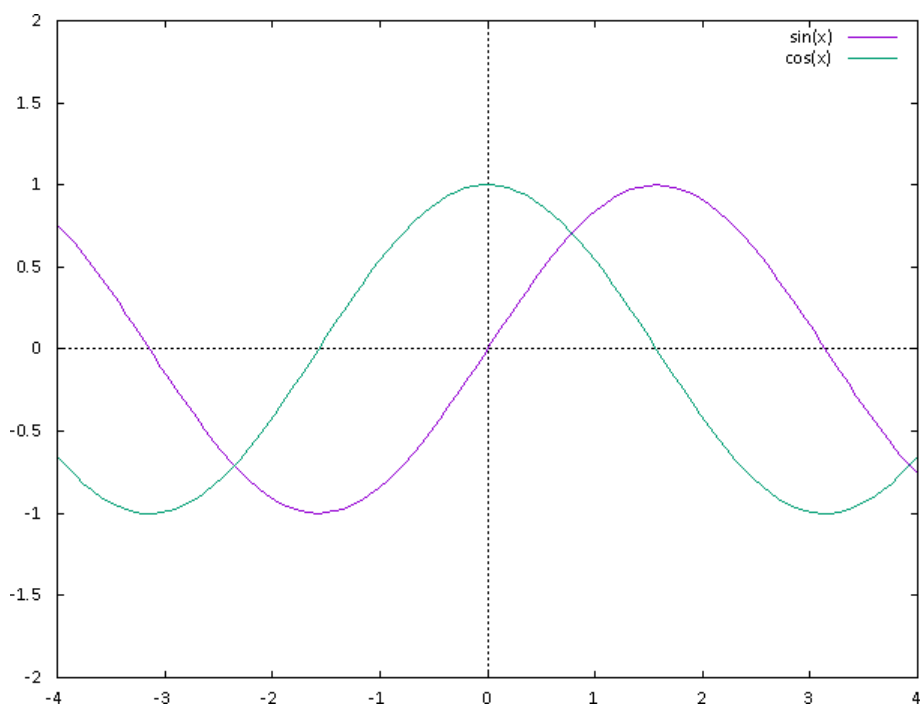
```



1.3 Sinus og cosins grafer

Eksemplet her under tegner cosinus og sinus i et x,y-koordinatsystem.

```
\begin{gnuplot}
set term png crop enhanced font "calibri, 10"
set output "sincos.png"
set yrange [-2:2]
set xrange [-4:4]
set xzeroaxis
set yzeroaxis
plot [-4:4] sin(x),cos(x)
\end{gnuplot}
\begin{center}
\mxiIncludegraphics[scale=0.75]{sincos.png}
\end{center}
```



1.4 To parabler

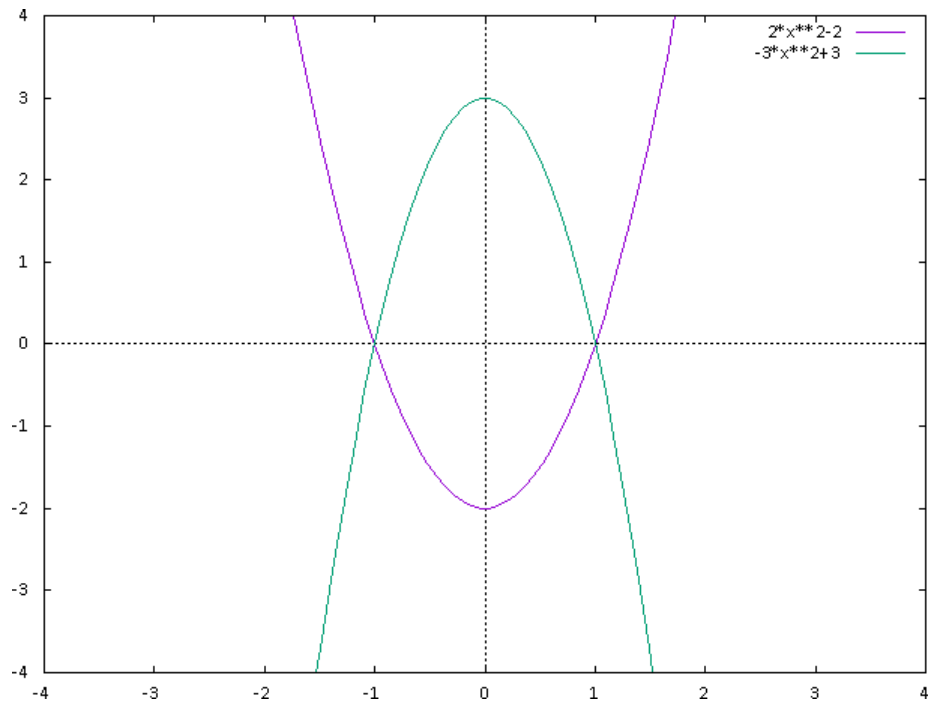
Skæring mellem parablerne kan udregnes med *Maxima*.

$$2 * x^2 - 2 = -3 * x^2 + 3$$

Parablerne skære i

$$\left[x = -\frac{\sqrt{6}}{\sqrt{5}}, x = \frac{\sqrt{6}}{\sqrt{5}} \right]$$

```
\begin{gnuplot}
set term png crop enhanced font "calibri, 10"
set output "parables.png"
set xzeroaxis
set yzeroaxis
set yrange [-4:4]
plot [-4:4] 2*x**2-2,-3*x**2+3
\end{gnuplot}
\begin{center}
  \mxiIncludegraphics[scale=0.75]{parables.png}
\end{center}
```



1.5 Eksempel med 3D

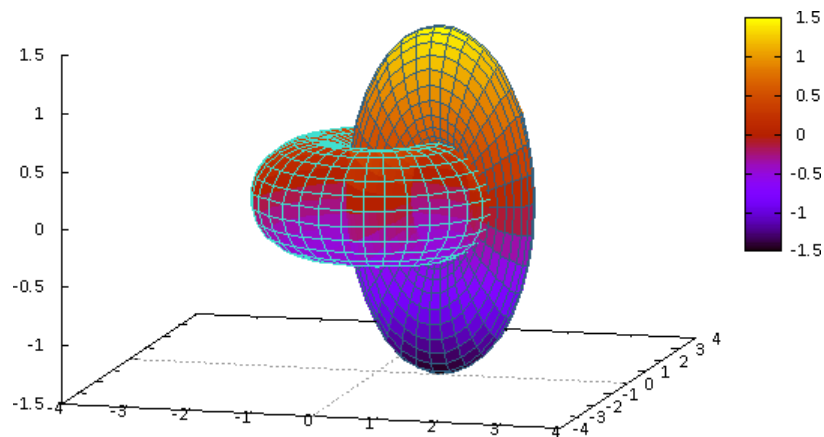
Eksemplet viser hvordan *Gnuplot* har mulighed for at arbejde med avancerede grafisk udtryk.

```
\begin{gnuplot}
  set term png crop enhanced font "calibri, 10"
  set output "toros.png"
  set parametric
  set urange [0:2*pi]
  set vrange [-pi:pi]
  set isosamples 36,24
  set hidden3d
  set view 75,15,1,1
  unset key
  set ticslevel 0
  x1(u,v)=cos(u)+1*cos(u)*cos(v)
  y1(u,v)=sin(u)+1*sin(u)*cos(v)
  z1(u,v)=.5*sin(v)
  x2(u,v)=1+cos(u)+.5*cos(u)*cos(v)
  y2(u,v)=.5*sin(v)
  z2(u,v)=sin(u)+.5*sin(u)*cos(v)
  set multiplot
  splot x1(u,v), y1(u,v), z1(u,v) w pm3d, x2(u,v), y2(u,v), z2(u,v) w pm3d
```

```

    splot x1(u,v), y1(u,v), z1(u,v) lt 3,    x2(u,v), y2(u,v), z2(u,v) lt 5
\end{gnuplot}
\begin{center}
    \mxiIncludegraphics[scale=0.75]{toros.png}
\end{center}

```



Let us examine the `\mxiIncludegraphics` command: its usage is the same as `includegraphics` from package `graphicx`; in fact, it just makes sure that the graphic file exists before invoking that macro.

1.6 Problemer

Hvis du oplever problemer med at typesetting-processen fejler med at png-billedfilen er “korrupt” så prøv at slette filen og typeset ingen.