# Maxiplot: Maxima and Gnuplot in LaTeX.

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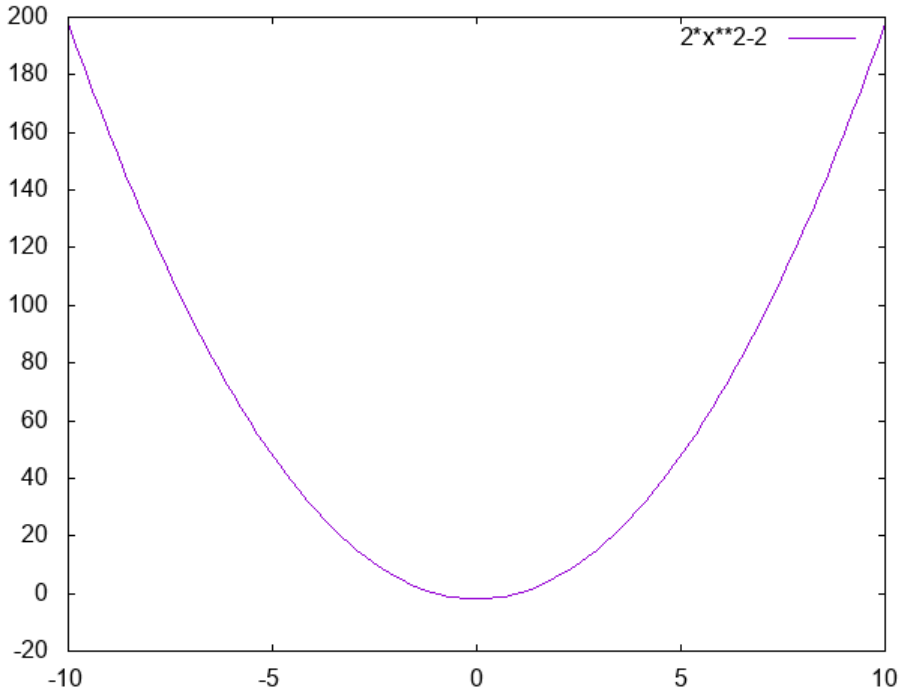
## 1 Gnuplot

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

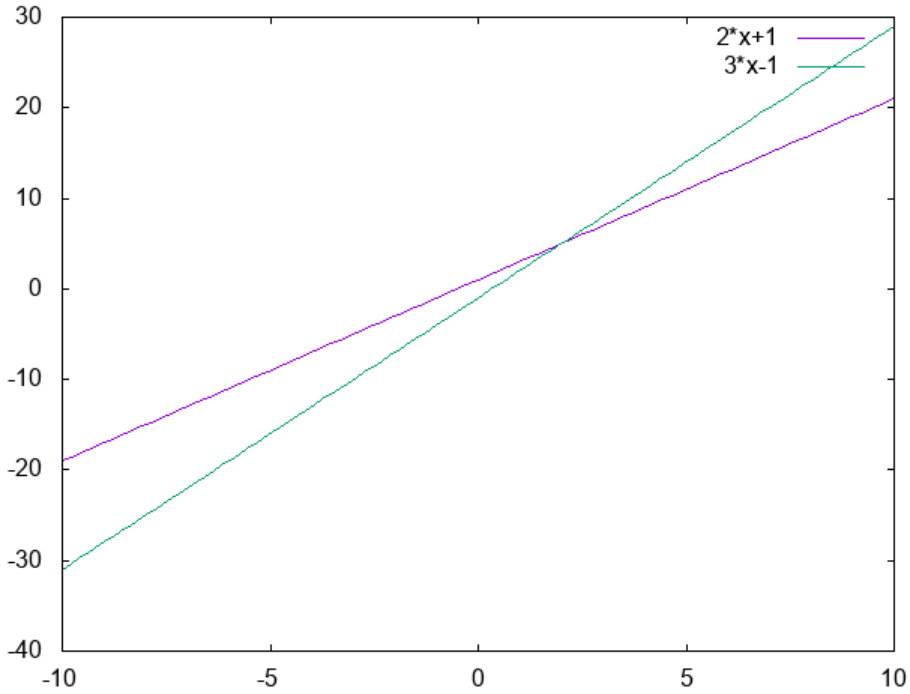
### 1.1 Parabel

```
\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

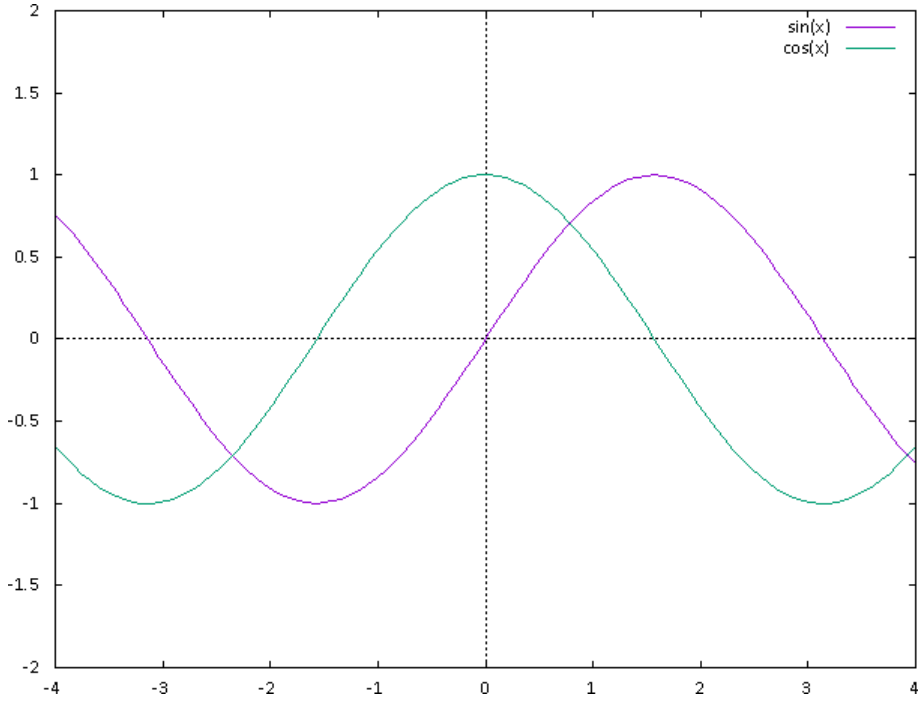
```
\begin{gnuplot}
set term png
set output "lines.png"
plot 2*x+1,3*x-1
\end{gnuplot}
\begin{center}
  \mxpIncludegraphics[scale=0.75]{lines.png}
\end{center}
```




### 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}
  \mxpIncludegraphics[scale=0.75]{sincos.png}
\end{center}
```




## 1.4 To parabler

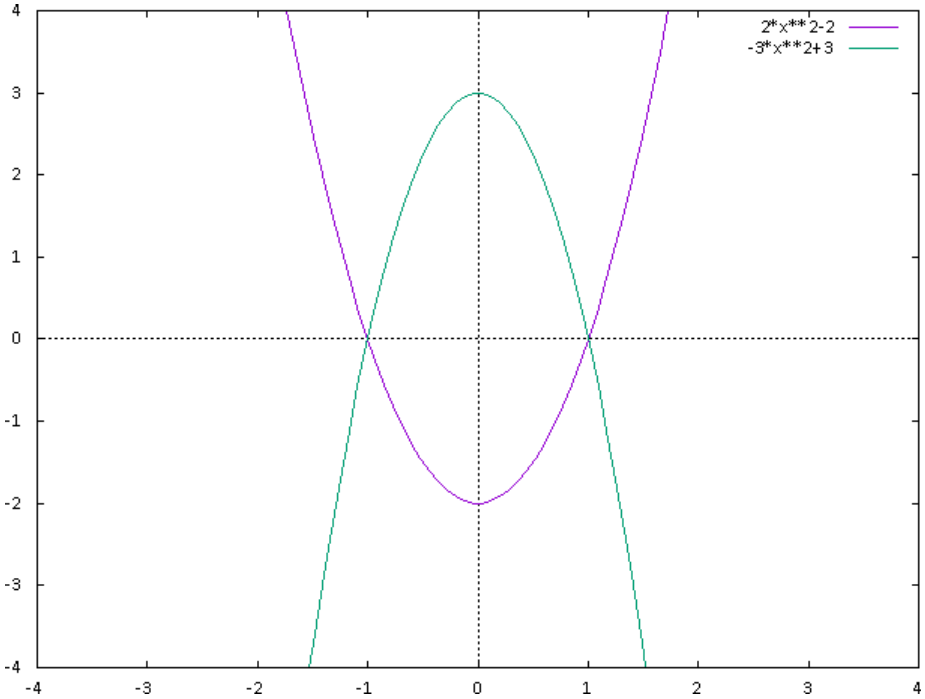
Skæring mellem parabelerne kan udregnes med Maxima.

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

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}
  \mxpIncludegraphics[scale=0.75]{parables.png}
\end{center}
```

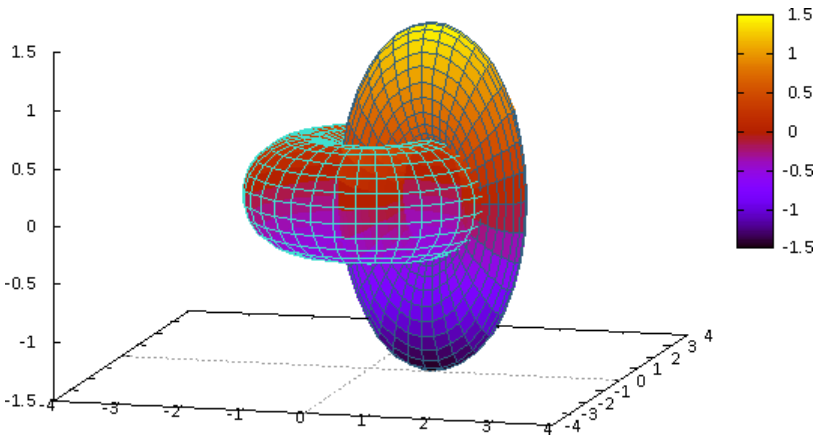



### 1.5 Eksempel med 3D

Eksemplet viser hvordan Gnuplot har mulighed for at arbejde med advancerede 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}
  \mxpIncludegraphics[scale=0.75]{toros.png}
\end{center}
```




## 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.