

# GNU PLOT

Popuno funkcionalan u portabilnom obliku alat za crtanje 2D, 3D, linijskih, stupčastih... grafova (može se pokrenuti i s USB diska na drugom računalu).

## Homepage:

<http://www.gnuplot.info/>

## Arhiva:

<https://sourceforge.net/projects/gnuplot/files/gnuplot/5.0.3/gp503-win32-mingw.zip/download>

## Instalacija:

1. Dearhivirati u neki direktorij čija adresa ne sadrži razmake.
2. Pokrenuti **wgnuplot.exe** koji se nalazi unutar poddirektorija bin.
3. Po želji kreirati prečac (desni klik na wgnuplot.exe -> Send to -> Desktop).
4. Naredbom **plot** f(x) ili plot 'podaci.txt' crtaju se 2D, a naredbom **splot** 3D grafovi.

## Primjeri grafova:

[http://gnuplot.sourceforge.net/demo\\_5.1/](http://gnuplot.sourceforge.net/demo_5.1/)

## Primjeri s objašnjenima:

<http://lowrank.net/gnuplot/index-e.html>

## Plotanje pomoću skripti:

1. Kreirati datoteku **IME.plt** i pohraniti naredbe u njoj koristeći tekstualni editor (Notepad, Notepad++ i sl.).
2. Naredbe za crtanje i postavljanje okoline upisuju se u zasebne linije. Ako se radi preglednosti naredba upisuje u više linija, koristi se znak `\` koji označava njen nastavak u sljedećoj liniji. Gnuplot ignorira sadržaj iza znaka **#** te ga interpretira kao komentar.
3. Pokrenuti skriptu na neki od sljedeća 2 načina (2. ispisuje greške ako postoje u skripti):
  - a) dvostruki klik na **IME.plt** (ukoliko se pokreće prvi put, OS će pitati s kojim programom želite otvoriti tu datoteku - odaberite wgnupot.exe koji je u instalacijskom direktoriju unutar bin)
  - b) naredbama: **cd 'ADRESA DIREKTORIJA U KOJEM JE POHRANJENA SKRIPTA'**  
**load 'IME.plt'**

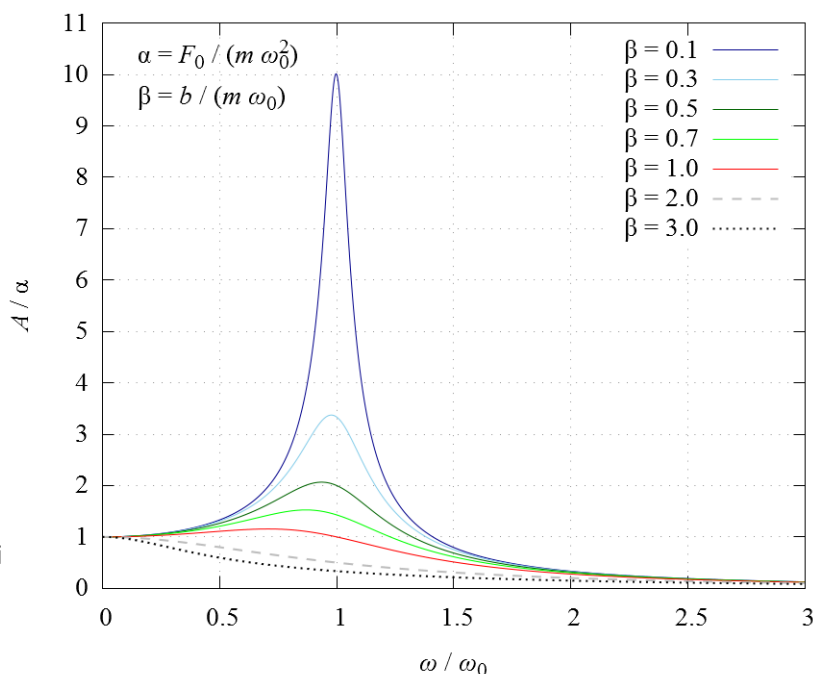
## Primjer skripte za crtanje :

Na sljedećoj je stranici primjer skripte koji, za različit faktor gušenja  $\beta$ , prikazuje ovisnost amplitude  $A$  (prisilnih harmonijskih oscilacija mase  $m$ ) o omjeru frekvencija  $\omega$  i  $\omega_0$  redom vanjske oscilatorne sile amplitude  $F_0$  i idealnog harmonijskog oscilatora.

Radi jednostavnosti amplituda

$$A(\omega) = \frac{F_0/m}{\sqrt{(\omega_0^2 - \omega^2)^2 + (2\delta\omega)^2}}$$
$$A\left(x = \frac{\omega}{\omega_0}\right) = \frac{\alpha}{\sqrt{(1-x^2)^2 + (\beta x)^2}}$$

izražena je u jedinicama  $\alpha$  koje su kao i faktor gušenja  $\beta$  navedene na slici desno. Pokretanjem skripte generira se desna slika i pohranjuje u A.png.



```
unset multiplot
reset
set encoding utf8
```

### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

### #STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

### #MARGINI I PRECIZNOST

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
```

```
set grid #KOORDINATNA MREZA
```

```
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
```

```
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
```

```
set xrange [0:3] #RASPON x-VRIJEDNOSTI
```

```
#TEKST
```

```
set xlabel "{/Times-New-Roman-Italic ω} / {/Times-New-Roman-Italic ω}_0"
```

```
set ylabel "{/Times-New-Roman-Italic A} / α"
```

```
set label "α = {/Times-New-Roman-Italic F}_0 / ({/Times-New-Roman-Italic m ω}@_0^2)" at graph 0.05, graph 0.95
```

```
set label "β = {/Times-New-Roman-Italic b} / ({/Times-New-Roman-Italic m ω}_0)" at graph 0.05, graph 0.87
```

```
#ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED
```

```
#CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM
```

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
      A(x,0.3) w l ls 3 ti 'β = 0.3', \
      A(x,0.5) w l ls 5 ti 'β = 0.5', \
      A(x,0.7) w l ls 7 ti 'β = 0.7', \
      A(x,1.0) w l ls 10 ti 'β = 1.0', \
      A(x,2.0) w l ls 13 ti 'β = 2.0', \
      A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
unset multiplot
```

```
unset output
```

```
reset
```

```
set terminal windows enhanced
```

### Legenda:

- ✓ Pri crtanju drugih grafova potrebno je samo promijeniti **crveni** sadržaj dok **crni** može ostati isti.
- ✓ Objašnjenja su označena komentarima (**plavo**), a detaljnija objašnjenja mogu se dobiti klikom na podcrtani sadržaj ili upisom naredbe u gnuplot **help OVO** gdje je OVO neka naredba, npr. plot.
- ✓ Detaljnija objašnjenja nestaju klikom na ☒

```
unset multiplot
reset
set encoding utf8
```

```
#POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

```
# set term pngcairo background "#ffffff" postavlja terminal za pohranu
# grafa u png datoteku bijele boje pozadine
# HEX zapis boje: http://www.w3schools.com/colors/colors\_picker.asp
# font se definira naredbom font "TIP FONTA,VELIČINA"
# veličina slike definira se naredbom size ŠIRINA,VISINA
# uvećavanje slova (skaliranje) obavlja se sa fontscale OMJER
# razmak isprekidanih dijelova linije podešava se faktorom dl OMJER
# IME datoteke za pohranu grafa definira se naredbom
set output 'IME.png'
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

```
#DEFINICIJA FUNKCIJE
```

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
```

```
set grid #KOORDINATNA MREZA
```

```
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
```

```
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
```

```
set xrange [0:3] #RASPON x-VRIJEDNOSTI
```

```
#TEKST
```

```
set xlabel "{/Times-New-Roman-Italic  $\omega$ } / {/Times-New-Roman-Italic  $\omega$ }_0"
```

```
set ylabel "{/Times-New-Roman-Italic A} /  $\alpha$ "
```

```
set label " $\alpha = {/Times-New-Roman-Italic F}_0 / ({/Times-New-Roman-Italic m \omega})@_0^2$ " at graph 0.05, graph 0.95
```

```
set label " $\beta = {/Times-New-Roman-Italic b} / ({/Times-New-Roman-Italic m \omega})_0$ " at graph 0.05, graph 0.87
```

```
#ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED
```

```
#CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM
```

```
plot A(x,0.1) w l ls 1 ti ' $\beta = 0.1$ ', \
      A(x,0.3) w l ls 3 ti ' $\beta = 0.3$ ', \
      A(x,0.5) w l ls 5 ti ' $\beta = 0.5$ ', \
      A(x,0.7) w l ls 7 ti ' $\beta = 0.7$ ', \
      A(x,1.0) w l ls 10 ti ' $\beta = 1.0$ ', \
      A(x,2.0) w l ls 13 ti ' $\beta = 2.0$ ', \
      A(x,3.0) w l ls 14 ti ' $\beta = 3.0$ '
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```

```
unset multiplot
reset
set encoding utf8
```

```
#POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA
```

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

```
#STILOVI LINIJA; POZIV: ls BROJ
```

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
# pomoću set style line BROJ definira se stil linije specificirajući:
```

```
# - kontinuiranost (linetype): lt 1
```

```
# - širinu (linewidth): lw ŠIRINA
```

```
# - tip isprekidanosti (dashtype): dt 'TIP'
```

```
# - za crtkane TIP je -, za točkaste . i slično
```

```
# - boju (linecolor): lc rgb "BOJA"
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
```

```
set grid #KOORDINATNA MREZA
```

```
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
```

```
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
```

```
set xrange [0:3] #RASPON x-VRIJEDNOSTI
```

```
#TEKST
```

```
set xlabel "{/Times-New-Roman-Italic  $\omega$ } / {/Times-New-Roman-Italic  $\omega$ }_0"
```

```
set ylabel "{/Times-New-Roman-Italic A} /  $\alpha$ "
```

```
set label " $\alpha = \{ /Times-New-Roman-Italic F \}_0 / (\{ /Times-New-Roman-Italic m \omega \}_0^2)$ " at graph 0.05, graph 0.95
```

```
set label " $\beta = \{ /Times-New-Roman-Italic b \} / (\{ /Times-New-Roman-Italic m \omega \}_0)$ " at graph 0.05, graph 0.87
```

```
#ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED
```

```
#CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM
```

```
plot A(x,0.1) w l ls 1 ti ' $\beta = 0.1$ ', \
      A(x,0.3) w l ls 3 ti ' $\beta = 0.3$ ', \
      A(x,0.5) w l ls 5 ti ' $\beta = 0.5$ ', \
      A(x,0.7) w l ls 7 ti ' $\beta = 0.7$ ', \
      A(x,1.0) w l ls 10 ti ' $\beta = 1.0$ ', \
      A(x,2.0) w l ls 13 ti ' $\beta = 2.0$ ', \
      A(x,3.0) w l ls 14 ti ' $\beta = 3.0$ '
```

```
unset multiplot
```

```
unset output
```

```
reset
```

```
set terminal windows enhanced
```

```
unset multiplot
reset
set encoding utf8
```

#POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

#STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

# pomoću set samples BROJ definiramo BROJ točaka u kojim  
# računa funkciju pa linije crta povezujući točke  
# - ako linijama crtamo funkciju, optimalniji je veći BROJ  
# - ako simbolima prikazujemo vrijednosti, optimalniji je manji BROJ  
# pomoću bmargin 0. i sličnih naredbi uklanjamo marigine  
# odnosno postavljamo ih na 0 jer nisu potrebne u multiplot okolini

```
set xlabel "{/Times-New-Roman-Italic ω} / {/Times-New-Roman-Italic ω}_0"
set ylabel "{/Times-New-Roman-Italic A} / α"
set label "α = {/Times-New-Roman-Italic F}_0 / ({/Times-New-Roman-Italic m ω}@_0^2)" at graph 0.05, graph 0.95
set label "β = {/Times-New-Roman-Italic b} / ({/Times-New-Roman-Italic m ω}_0)" at graph 0.05, graph 0.87
```

#ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED

#CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
      A(x,0.3) w l ls 3 ti 'β = 0.3', \
      A(x,0.5) w l ls 5 ti 'β = 0.5', \
      A(x,0.7) w l ls 7 ti 'β = 0.7', \
      A(x,1.0) w l ls 10 ti 'β = 1.0', \
      A(x,2.0) w l ls 13 ti 'β = 2.0', \
      A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```

```
unset multiplot
reset
set encoding utf8
```

```
#POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA
```

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

```
#STILOVI LINIJA; POZIV: ls BROJ
```

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

```
#DEFINICIJA FUNKCIJE
```

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
# ANALITIČKI IZRAZ funkcije definiramo slično kao u C-u, s tim da je:
```

```
# - korijen IZRAZa = sqrt(IZRAZ)
```

```
# - operator potenciranja ** pa  $x^2$  unosimo sa  $x**2$ 
```

```
# - detaljnije informacije dobijemo upisom naredbe u gnuplotu:
```

```
help expressions functions
```

```
# IME funkcije definiramo slovima,
```

```
# a argumente navodimo u zagradama, odvojene zarezom
```

```
IME(x,ARGUMENT1,...) = ANALITIČKI IZRAZ
```

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
A(x,0.3) w l ls 3 ti 'β = 0.3', \
A(x,0.5) w l ls 5 ti 'β = 0.5', \
A(x,0.7) w l ls 7 ti 'β = 0.7', \
A(x,1.0) w l ls 10 ti 'β = 1.0', \
A(x,2.0) w l ls 13 ti 'β = 2.0', \
A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```



```
unset multiplot
reset
set encoding utf8
```

#### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
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set output 'A.png'
```

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set style line 6 lt 1 lw 1 lc rgb "web-green"
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set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

#### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
```

```
# postavljanje legende {top, bottom} {left, right}
```

```
set key VERTIKALNO HORIZONTALNO
```

```
# skrivanje legende
```

```
unset key
```

```
set label " $\alpha = \frac{1}{\sqrt{1-x^2}}$ " at graph 0.05, graph 0.95
```

```
set label " $\beta = \frac{b}{\sqrt{1-x^2}}$ " at graph 0.05, graph 0.87
```

```
#ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED
```

```
#CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM
```

```
plot A(x,0.1) w l ls 1 ti '\beta = 0.1', \
      A(x,0.3) w l ls 3 ti '\beta = 0.3', \
      A(x,0.5) w l ls 5 ti '\beta = 0.5', \
      A(x,0.7) w l ls 7 ti '\beta = 0.7', \
      A(x,1.0) w l ls 10 ti '\beta = 1.0', \
      A(x,2.0) w l ls 13 ti '\beta = 2.0', \
      A(x,3.0) w l ls 14 ti '\beta = 3.0'
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```



```
unset multiplot
reset
set encoding utf8
```

### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

### #STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
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set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
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set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
set key top right #POSTAVLJA LEGENDU GORE DESNO
set grid #KOORDINATNA MREZA
```

### # prikaz koordinatne mreže

```
set grid
```

### # skrivanje koordinatne mreže

```
unset grid
```

```
set label "β = {/Times-New-Roman-Italic b} / {/Times-New-Roman-Italic m ω}_0)" at graph 0.05, graph 0.87
```

### #ZNAK \ NA KRAJU LINIJE OZNACAVA PRELAZAK NAREDBE U NOVI RED

### #CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
    A(x,0.3) w l ls 3 ti 'β = 0.3', \
    A(x,0.5) w l ls 5 ti 'β = 0.5', \
    A(x,0.7) w l ls 7 ti 'β = 0.7', \
    A(x,1.0) w l ls 10 ti 'β = 1.0', \
    A(x,2.0) w l ls 13 ti 'β = 2.0', \
    A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```



0.95



```
unset multiplot
reset
set encoding utf8
```

### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

### #STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
set grid #KOORDINATNA MREZA
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
```

# donji lijevi rub grafa (origin) i veličina područja (size) za graf

# X i Y dani su relativno u odnosu na širinu i visinu slike

```
set origin X1, Y1
```

```
set size X2, Y2
```

### #CRTANJE VISE FUNKCIJA ODVOJENIH ZAREZOM

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
      A(x,0.3) w l ls 3 ti 'β = 0.3', \
      A(x,0.5) w l ls 5 ti 'β = 0.5', \
      A(x,0.7) w l ls 7 ti 'β = 0.7', \
      A(x,1.0) w l ls 10 ti 'β = 1.0', \
      A(x,2.0) w l ls 13 ti 'β = 2.0', \
      A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```



0.95

```
unset multiplot
reset
set encoding utf8
```

### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

### #STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
set grid #KOORDINATNA MREZA
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
set xrange [0:3] #RASPON x-VRIJEDNOSTI
```

```
# prikaz x-vrijednosti od broja XMIN do XMAX
```

```
set xrange [XMIN:XMAX]
```

```
# prikaz y vrijednosti od broja YMIN do YMAX
```

```
set yrange [YMIN:YMAX]
```

```
# ako je izostavljena naredba xrange ili yrange ili upisan raspon [:]
```

```
# bez brojeva, gnuplot sam procjenjuje raspon
```

```
A(x,0.7) w l ls 7 dt p 0.7, \
```

```
A(x,2.0) w l ls 13 dt '-', \
```

```
A(x,3.0) w l ls 14 dt '.', \
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```



0.95

```
unset multiplot
reset
set encoding utf8
```

### #POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

### #STILOVI LINIJA; POZIV: ls BROJ

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

### #DEFINICIJA FUNKCIJE

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set multiplot
```

```
set key top right #POSTAVLJA LEGENDU GORE DESNO
```

```
set grid #KOORDINATNA MREZA
```

```
set origin 0.12,0.15 #POMICANJE POCETKA GRAFA KAKO BI STALI OPISI KOORDINATNIH OSI
```

```
set size 0.86,0.83 #VELICINA PODRUCJA U KOJEM ISCRTAVA GRAF (UDIO U 1.0 X 1.0)
```

```
set xrange [0:3] #RASPON x-VRIJEDNOSTI
```

```
#TEKST
```

```
set xlabel "{/Times-New-Roman-Italic ω} / {/Times-New-Roman-Italic ω}_0"
```

```
set ylabel "{/Times-New-Roman-Italic A} / α"
```

```
set label "α = {/Times-New-Roman-Italic F}_0 / ({/Times-New-Roman-Italic m ω}@_0^2)" at graph 0.05, graph 0.95
```

```
set label "β = {/Times-New-Roman-Italic b} / ({/Times-New-Roman-Italic m ω}_0)" at graph 0.05, graph 0.87
```

# xlabel – TEKST ispod x-osi, ylabel – tekst lijevo od y-osi

# label – TEKST bilo gdje na grafu, odnosno na položaju

# at UDIO ŠIRINE GRAFA, UDIO VISINE GRAFA

set xlabel "TEKST"

set label "TEKST" at graph UDIO, graph UDIO

# kosi (italic) TEKST definiramo naredbom za promjenu fonta:

# {/Times-New-Roman-Italic TEKST}

# simboli: <http://www.key-shortcut.com/en/windows-keyboard/windows-special-characters/>



```
unset multiplot
reset
set encoding utf8
```

```
#POSTAVKE GRAFA: TIP I VELICINA FONTA, DIMENZIJE SLIKE, IME SLIKE, SKALIRANJE FONTA I CRTICA
```

```
set term pngcairo background "#ffffff" font "Times-New-Roman,20pt" size 30.0cm,25.0cm fontscale 1.0 dl 2.0
set output 'A.png'
```

```
#STILOVI LINIJA; POZIV: ls BROJ
```

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
set style line 2 lt 1 lw 1 lc rgb "blue"
set style line 3 lt 1 lw 1 lc rgb "skyblue"
set style line 4 lt 1 lw 1 lc rgb "cyan"
set style line 5 lt 1 lw 1 lc rgb "dark-green"
set style line 6 lt 1 lw 1 lc rgb "web-green"
set style line 7 lt 1 lw 1 lc rgb "green"
set style line 8 lt 1 lw 1 lc rgb "yellow-green"
set style line 9 lt 1 lw 1 lc rgb "orange"
set style line 10 lt 1 lw 1 lc rgb "red"
set style line 11 lt 1 lw 1 lc rgb "dark-red"
set style line 12 lt 1 lw 1 lc rgb "magenta"
set style line 13 lt 1 lw 2 dt '-' lc rgb "gray"
set style line 14 lt 1 lw 2 dt '.' lc rgb "black"
```

```
set samples 10000
set bmargin 0.
set lmargin 0.
set rmargin 0.
set tmargin 0.
```

```
#DEFINICIJA FUNKCIJE
```

```
A(x,b) = 1.0/sqrt((1.0 - x**2)**2 + b**2*x**2)
```

```
set mu # naredba plot crta graf funkcija odvojenih zarezom
set k # funkcije navodimo imenima kojima su definirane ili analitički
set g # način prikaza: s linijama (with lines): w l
set o # stila (linestyle): ls BROJ
set si # s opisom u legendi (title): ti 'OPIS'
set : # ili s točkama-simbolima (with points): w p
set : # veličine (pointsize): ps BROJ
set : # tipa-oblika (pointtype): pt BROJ
#ZN
#CR
```

```
plot A(x,0.1) w l ls 1 ti 'β = 0.1', \
A(x,0.3) w l ls 3 ti 'β = 0.3', \
A(x,0.5) w l ls 5 ti 'β = 0.5', \
A(x,0.7) w l ls 7 ti 'β = 0.7', \
A(x,1.0) w l ls 10 ti 'β = 1.0', \
A(x,2.0) w l ls 13 ti 'β = 2.0', \
A(x,3.0) w l ls 14 ti 'β = 3.0'
```

```
# ako su umjesto analitičkog izraza dani
# podaci u datoteci PODACI.txt s tim da su
# x vrijednosti u stupcu N, a y u stupcu M
# koristi se (using) umjesto izraza za funkciju
# 'PODACI.txt' u N:M
```

```
unset multiplot
unset output
reset
set terminal windows enhanced
```

# BOJE

white = #ffffff	light-magenta = #f055f0	orangered4 = #801400
black = #000000	light-cyan = #e0ffff	brown4 = #801414
dark-grey = #a0a0a0	light-goldenrod = #eedd82	sienna4 = #804014
red = #ff0000	light-pink = #ffb6c1	orchid4 = #804080
web-green = #00c000	light-turquoise = #afeeee	mediumpurple3 = #8060c0
web-blue = #0080ff	gold = #ffd700	slateblue1 = #8060ff
dark-magenta = #c000ff	green = #00ff00	yellow4 = #808000
dark-cyan = #00e0ff	dark-green = #006400	sienna1 = #ff8040
dark-orange = #c04000	spring-green = #00ff7f	tan1 = #ffa040
dark-yellow = #c8c800	forest-green = #228b22	sandybrown = #ffa060
royalblue = #4169e1	sea-green = #2e8b57	light-salmon = #ffa070
goldenrod = #ffc020	blue = #0000ff	pink = #ffc0c0
dark-spring-green = #008040	dark-blue = #00008b	khaki1 = #ffff80
purple = #800080	midnight-blue = #191970	lemonchiffon = #ffffc0
steelblue = #306080	navy = #000080	bisque = #cdeb7e
dark-red = #8b0000	medium-blue = #0000cd	honeydew = #f0fff0
dark-chartreuse = #408000	skyblue = #87ceeb	slategrey = #a0b6cd
orchid = #ff80ff	cyan = #00ffff	seagreen = #c1ffc1
aquamarine = #7fffd4	magenta = #ff00ff	antiquewhite = #cdec0b
brown = #a52a2a	dark-turquoise = #00ced1	chartreuse = #7cfc40
yellow = #ffff00	dark-pink = #ff1493	greenyellow = #a0ff20
turquoise = #40e0d0	coral = #ff7f50	gray = #bebebe
grey0 = #000000	light-coral = #ff8080	light-gray = #d3d3d3
grey10 = #1a1a1a	orange-red = #ff4500	light-grey = #d3d3d3
grey20 = #333333	salmon = #fa8072	dark-gray = #a0a0a0
grey30 = #4d4d4d	dark-salmon = #e9967a	slategray = #a0b6cd
grey40 = #666666	khaki = #f0e68c	gray0 = #000000
grey50 = #7f7f7f	dark-khaki = #bdb76b	gray10 = #1a1a1a
grey60 = #999999	dark-goldenrod = #b8860b	gray20 = #333333
grey70 = #b3b3b3	beige = #f5f5dc	gray30 = #4d4d4d
grey80 = #cccccc	olive = #a08000	gray40 = #666666
grey90 = #e5e5e5	orange = #ffa500	gray50 = #7f7f7f
grey100 = #ffffff	violet = #ee82ee	gray60 = #999999
light-red = #f03232	dark-violet = #9400d3	gray70 = #b3b3b3
light-green = #90ee90	plum = #dda0dd	gray80 = #cccccc
light-blue = #add8e6	dark-plum = #905040	gray90 = #e5e5e5
	dark-olivegreen = #556b2f	gray100 = #ffffff

# SIMBOLI – mogu varirati ovisno o terminalu i verziji gnuplota

0	.	10	▽	20	⊕	30	⊕	40	⊕	50	⊕	60	⊕	70	⊕	80	⊕	90	⊕	100	⊕	110	⊕	120	⊕	130	⊕	140	⊕	150	⊕
1	+	11	▽	21	⊕	31	⊕	41	⊕	51	⊕	61	⊕	71	⊕	81	⊕	91	⊕	101	⊕	111	⊕	121	⊕	131	⊕	141	⊕	151	⊕
2	×	12	◇	22	⊕	32	⊕	42	⊕	52	⊕	62	⊕	72	⊕	82	⊕	92	⊕	102	⊕	112	⊕	122	⊕	132	⊕	142	⊕	152	⊕
3	*	13	◇	23	⊕	33	⊕	43	⊕	53	⊕	63	⊕	73	⊕	83	⊕	93	⊕	103	⊕	113	⊕	123	⊕	133	⊕	143	⊕	153	⊕
4	□	14	◇	24	⊕	34	⊕	44	⊕	54	⊕	64	⊕	74	⊕	84	⊕	94	⊕	104	⊕	114	⊕	124	⊕	134	⊕	144	⊕	154	⊕
5	□	15	◇	25	⊕	35	⊕	45	⊕	55	⊕	65	⊕	75	⊕	85	⊕	95	⊕	105	⊕	115	⊕	125	⊕	135	⊕	145	⊕	155	⊕
6	○	16	⊕	26	⊕	36	⊕	46	⊕	56	⊕	66	⊕	76	⊕	86	⊕	96	⊕	106	⊕	116	⊕	126	⊕	136	⊕	146	⊕	156	⊕
7	●	17	⊕	27	⊕	37	⊕	47	⊕	57	⊕	67	⊕	77	⊕	87	⊕	97	⊕	107	⊕	117	⊕	127	⊕	137	⊕	147	⊕	157	⊕
8	△	18	⊕	28	⊕	38	⊕	48	⊕	58	⊕	68	⊕	78	⊕	88	⊕	98	⊕	108	⊕	118	⊕	128	⊕	138	⊕	148	⊕	158	⊕
9	▲	19	⊕	29	⊕	39	⊕	49	⊕	59	⊕	69	⊕	79	⊕	89	⊕	99	⊕	109	⊕	119	⊕	129	⊕	139	⊕	149	⊕	159	⊕

# SKRIPTA – klik na nju za povratak

```

unset multiplot
reset
set encoding utf8

#POSTAVKE GRAFA: TIPI I VELICINA FONTA, DIMENZIE SLICE, IME SLICE, QUALITATNE FONTA I CRTICA
set term pngcairo background "ffffff" font "Times-New-Roman,20pt" size 30,5cm,2.5cm fontscale 1.0 d 2.0
set output "A.png"

#STILOVA LINIJA; POZIVA: IS BROJI
set style line 1 lt 1 lw 3 lc rgb "dark-blue"
set style line 2 lt 1 lw 3 lc rgb "blue"
set style line 3 lt 1 lw 3 lc rgb "skyblue"
set style line 4 lt 1 lw 3 lc rgb "cyan"
set style line 5 lt 1 lw 3 lc rgb "dark-green"
set style line 6 lt 1 lw 3 lc rgb "green"
set style line 7 lt 1 lw 3 lc rgb "web-green"
set style line 8 lt 1 lw 3 lc rgb "orange"
set style line 9 lt 1 lw 3 lc rgb "red"
set style line 10 lt 1 lw 3 lc rgb "dark-red"
set style line 11 lt 1 lw 3 lc rgb "magenta"
set style line 12 lt 1 lw 2 dt "" lc rgb "gray"
set style line 13 lt 1 lw 2 dt "" lc rgb "black"

set samples 10000
set tmargin 0
set lmargin 0
set rmargin 0
set bmargin 0

#DEFINICIA FUNKCIJE
A(x) = 1.0/sqrt(1.0 - x**2)**2 + b**2*x**2

set multiplot
set key top right #POSTAVLJAJU LEGENDU GOBE DESNO
set grid #RECICIRATI NAJZNA
set origin 0.12,0.15 #POMICANJE POCKETA GRAFA KAKO BI STALI OPISE I KOORDINATNIH OSI
set size 0.8,0.8 #VELICINA POKCETA GRAFA I VELICINA OSGRAFIKA
set xrange [0:3] #BRASPOLNA VRIJEDNOSTI
set yrange [0:1]

#IZLASC
set xlabel "(Times-New-Roman-Italic u) / (Times-New-Roman-Italic u)"
set ylabel "(Times-New-Roman-Italic A) / a"
set label "a = (Times-New-Roman-Italic A) / a" at 0.1, 0.15 # (Times-New-Roman-Italic m u) @ [0:3] at graph 0.05, graph 0.85
set label "b = (Times-New-Roman-Italic b) / (Times-New-Roman-Italic u)" at 0.1, 0.15 # (Times-New-Roman-Italic m u) @ [0:3] at graph 0.05, graph 0.87

#KONNA NA KRAJU LINIJE ODNOVAVA PRAZAN NAHREDE U NOVIM RED
#IZLASC: GOBE, FUNKCIJA ODNOVAVA PRAZAN NAHREDE
plot A(x) w l l w l b 1 b 0.1, \
      A(x) w l l w l b 2 b 0.1, \
      A(x) w l l w l b 3 b 0.1, \
      A(x) w l l w l b 4 b 0.1, \
      A(x) w l l w l b 5 b 0.1, \
      A(x) w l l w l b 6 b 0.1, \
      A(x) w l l w l b 7 b 0.1, \
      A(x) w l l w l b 8 b 0.1, \
      A(x) w l l w l b 9 b 0.1, \
      A(x) w l l w l b 10 b 0.1, \
      A(x) w l l w l b 11 b 0.1, \
      A(x) w l l w l b 12 b 0.1, \
      A(x) w l l w l b 13 b 0.1

unset multiplot
unset output
reset
set terminal windows enhanced

```