

# 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'**

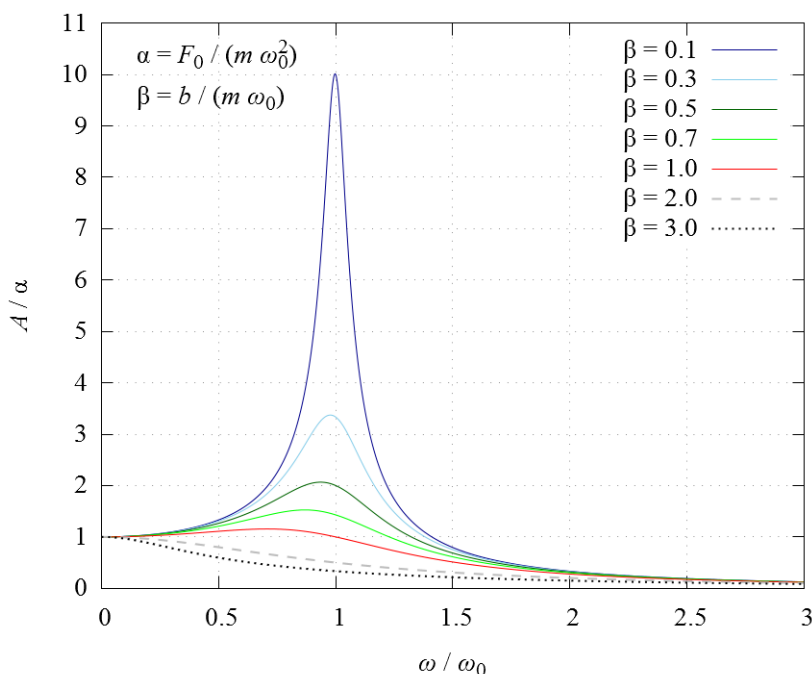
## Primjer skripte za crtanje :

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"
```

### #MARIGINE I PRECIZNOST

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

### #DEFINICIJA FUNKCIJE

$A(x,b) = 1.0/\sqrt{(1.0 - x^2)^2 + b^2 \cdot x^2}$

```
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
```

### 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

$A(x,b) = 1.0/\sqrt{(1.0 - x^2)^2 + b^2 \cdot x^2}$

```
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

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

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

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

```
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 " $\alpha = \{ /Times-New-Roman-Italic F \}_0 / (\{ /Times-New-Roman-Italic m \omega \}_0 @_0^2)$ " 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

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set style line 1 lt 1 lw 1 lc rgb "dark-blue"
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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"
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set style line 4 lt 1 lw 1 lc rgb "cyan"
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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"
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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)
```

# 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
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set encoding utf8
```

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

```
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```

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

```
set style line 1 lt 1 lw 1 lc rgb "dark-blue"
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set style line 8 lt 1 lw 1 lc rgb "yellow-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**

$A(x,b) = 1.0/\sqrt{(1.0 - x^2)^2 + b^2 \cdot x^2}$

```
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 = {/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"
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```

```
set samples 10000
set bmargin 0.
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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
```



```
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
```

0.95

```
#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)
```

```
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 s 7 d p 0.7, \
A(x,1.0) w l s 10 ti 'β = 1.0', \
A(x,2.0) w l s 13 ti 'β = 2.0', \
A(x,3.0) w l s 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
#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
set k
set g
set o
set si
set
#TE
set
set
set
set
#ZN
#CR
```

# naredba plot crta graf funkcija odvojenih zarezom

# funkcije navodimo imenima kojima su definirane ili analitički

# način prikaza: s linijama (with lines): w l

stila (linestyle): ls BROJ

s opisom u legendi (title): ti 'OPIS'

ili s točkama-simbolima (with points): w p

veličine (pointsize): ps BROJ

tipa-oblika (pointtype): pt BROJ

```
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 = #00eeee         | 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 = #c080ff            | midnight-blue = #191970   | lemonchiffon = #ffffc0  |
| steelblue = #306080         | navy = #000080            | bisque = #cdb79e        |
| 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 = #cdc0b0  |
| brown = #a52a2a             | dark-turquoise = #00ced1  | chartreuse = #7cfc40    |
| yellow = #ffff00            | dark-pink = #ff1493       | greenyellow = #a0ffa0   |
| turquoise = #40e0d0         | coral = #ff7f50           | gray = #bebebe          |
| grey0 = #000000             | light-coral = #ff8080     | light-gray = #d3d3d3    |
| grey10 = #1a1a1a            | orange-red = #ffa500      | light-grey = #d3d3d3    |
| grey20 = #333333            | salmon = #ffa07a          | dark-gray = #a0a0a0     |
| grey30 = #4d4d4d            | dark-salmon = #e9967a     | slategrey = #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        |
| grey = #c0c0c0              | olive = #a08020           | gray40 = #666666        |
| grey80 = #cccccc            | orange = #ffa500          | gray50 = #7f7f7f        |
| grey90 = #e5e5e5            | violet = #ee82ee          | gray60 = #999999        |
| grey100 = #ffffff           | dark-violet = #800080     | gray70 = #b3b3b3        |
| light-red = #ff0000         | plum = #dd80dd            | gray80 = #cccccc        |
| light-green = #00ff00       | dark-plum = #800080       | gray90 = #e5e5e5        |
| light-blue = #add8e6        | 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 multipost
reset
set encoding utf8

!POSTAVKE: GRAFA, PTI I VELICHA FONTA, GRAVIRNE ŠIKE, IME ŠIKE, SKALIRANJE FONTA I CRTICA
!fonti mogu pogrešno baciti "errrrrr" font "Times New Roman_30pt" size 30.0cm, 3.5cm fontsize i 4.2 2.0
set output "Aupg"

!IZLOZI LKINA, POZIV I BIKOI
set style line 1 16 1w 1 c rgb "dark-blue"
set style line 2 15 1w 1 c rgb "blue"
set style line 3 11 1w 1 c rgb "violetblue"
set style line 4 10 1w 1 c rgb "violet"
set style line 5 10 1w 1 c rgb "cyan-green"
set style line 6 10 1w 1 c rgb "cyan"
set style line 7 10 1w 1 c rgb "green"
set style line 8 10 1w 1 c rgb "yellow-green"
set style line 9 10 1w 1 c rgb "orange"
set style line 10 10 1w 1 c rgb "red"
set style line 11 10 1w 1 c rgb "dark-red"
set style line 12 10 1w 1 c rgb "magenta"
set style line 13 10 1w 2 d " " c rgb "gray"
set style line 14 10 1w 2 d " " c rgb "black"

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

!DEFINICJA FUNKCIJE
ALB1 = 1.0/sqrt(1.0 - x**2)*x**2 - b**2*x**2)

set multipost
set key top right !POSTAVKA I LEGENDA GORE DESNO
set grid !RECIZNATI LKINIZI
set origin 0.0,0.0 !POSTAVKA: POČETAK GRAFA, KAKO BI STALI OVI KOORDINATNI OS
set size 0.8,0.8 !VELICHA POLOVINI I KOJEK CRTANJE, GDE !UOX I !UOY 1
set style 10 !BRANCI - !VELICINA!

!IZLOZI
set label 1 "Times New Roman-Italic 1" / !Times New Roman-Italic 1, 0"
set label 2 "Times New Roman-Italic 2" / !Times New Roman-Italic 2, 0"
set label 3 "Times New Roman-Italic 3" / !Times New Roman-Italic 3, 0"
set label 4 "Times New Roman-Italic 4" / !Times New Roman-Italic 4, 0"
set label 5 "Times New Roman-Italic 5" / !Times New Roman-Italic 5, 0"
set label 6 "Times New Roman-Italic 6" / !Times New Roman-Italic 6, 0"
set label 7 "Times New Roman-Italic 7" / !Times New Roman-Italic 7, 0"
set label 8 "Times New Roman-Italic 8" / !Times New Roman-Italic 8, 0"
set label 9 "Times New Roman-Italic 9" / !Times New Roman-Italic 9, 0"
set label 10 "Times New Roman-Italic 10" / !Times New Roman-Italic 10, 0"
set label 11 "Times New Roman-Italic 11" / !Times New Roman-Italic 11, 0"
set label 12 "Times New Roman-Italic 12" / !Times New Roman-Italic 12, 0"
set label 13 "Times New Roman-Italic 13" / !Times New Roman-Italic 13, 0"
set label 14 "Times New Roman-Italic 14" / !Times New Roman-Italic 14, 0"
set label 15 "Times New Roman-Italic 15" / !Times New Roman-Italic 15, 0"
set label 16 "Times New Roman-Italic 16" / !Times New Roman-Italic 16, 0"
set label 17 "Times New Roman-Italic 17" / !Times New Roman-Italic 17, 0"
set label 18 "Times New Roman-Italic 18" / !Times New Roman-Italic 18, 0"
set label 19 "Times New Roman-Italic 19" / !Times New Roman-Italic 19, 0"
set label 20 "Times New Roman-Italic 20" / !Times New Roman-Italic 20, 0"
set label 21 "Times New Roman-Italic 21" / !Times New Roman-Italic 21, 0"
set label 22 "Times New Roman-Italic 22" / !Times New Roman-Italic 22, 0"
set label 23 "Times New Roman-Italic 23" / !Times New Roman-Italic 23, 0"
set label 24 "Times New Roman-Italic 24" / !Times New Roman-Italic 24, 0"
set label 25 "Times New Roman-Italic 25" / !Times New Roman-Italic 25, 0"
set label 26 "Times New Roman-Italic 26" / !Times New Roman-Italic 26, 0"
set label 27 "Times New Roman-Italic 27" / !Times New Roman-Italic 27, 0"
set label 28 "Times New Roman-Italic 28" / !Times New Roman-Italic 28, 0"
set label 29 "Times New Roman-Italic 29" / !Times New Roman-Italic 29, 0"
set label 30 "Times New Roman-Italic 30" / !Times New Roman-Italic 30, 0"
set label 31 "Times New Roman-Italic 31" / !Times New Roman-Italic 31, 0"
set label 32 "Times New Roman-Italic 32" / !Times New Roman-Italic 32, 0"
set label 33 "Times New Roman-Italic 33" / !Times New Roman-Italic 33, 0"
set label 34 "Times New Roman-Italic 34" / !Times New Roman-Italic 34, 0"
set label 35 "Times New Roman-Italic 35" / !Times New Roman-Italic 35, 0"
set label 36 "Times New Roman-Italic 36" / !Times New Roman-Italic 36, 0"
set label 37 "Times New Roman-Italic 37" / !Times New Roman-Italic 37, 0"
set label 38 "Times New Roman-Italic 38" / !Times New Roman-Italic 38, 0"
set label 39 "Times New Roman-Italic 39" / !Times New Roman-Italic 39, 0"
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