

# Computational Aerodynamics — GNU PLOT HOWTO

## *x-y* plot

First create a post file suitable for gnuplot as follows (data interpolated along  $y = 0$ ):

```
AERO.201325962:~> warp -r test.wrp -i data.01 -op post.01 -pt gnuplot -py 0.0
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell to plot density (column 7) versus  $x$  (column 1):

```
plot 'post.01' using 1:7
```

If you want to compare two (or more post files), enter the following:

```
plot 'post.01' using 1:7, 'post.02' using 1:7
```

## Grid plot

First create a post file suitable for gnuplot as follows:

```
AERO.201325962:~> warp -r test.wrp -i data.01 -opg post.01 -pt gnuplot
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell:

```
reset

set view map; set key outside; unset key; set size ratio 0.8; set xlabel 'x, m'; set ylabel 'y, m'

splot 'post.01' using 1:2:2 with lines
```

## Grid plot with contour levels

First create a post file suitable for gnuplot as follows:

```
AERO.201325962:~> warp -r test.wrp -i data.01 -op post.01 -pt gnuplot
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell to plot the grid with the color of the

grid lines matching the contour levels of property #7 (density):

```
reset

set view map; set key outside; unset key; set size ratio 0.8; set xlabel 'x, m'; set ylabel 'y, m'

splot 'post.01' using 1:2:7 with l lc palette
```

## Vector plot

First create a post file suitable for gnuplot as follows:

```
AERO.201325962:~> warp -r test.wrp -i data.01 -op post.01 -pt gnuplot
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell to make a plot of the velocity vector (with the vectors scaling with the variable “scale”):

```
reset

set key outside; unset key; set size ratio 0.8; set xlabel 'x, m'; set ylabel 'y, m'; set macros; with_vectors = "using 1:2:($3*scale):($4*scale) w vectors"; scale = 0.00005

plot 'post.01' @with_vectors
```

## Contour plot

First create a post file suitable for gnuplot as follows:

```
AERO.201325962:~> warp -r test.wrp -i data.01 -op post.01 -pt gnuplot
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell to make a filled contour plot of the density (post file column number 7):

```
reset

unset key; unset surf; set view map; set contour base; set size ratio 0.8; set xlabel 'x, m'; set ylabel 'y, m'; set palette rgbformulae 22, 13, 10; set cntrparam levels 100

splot 'post.01' using 1:2:7 with l lc palette lw 1.5
```

## Filled contour plot

First create a post file suitable for gnuplot as follows:

```
AERO.201325962:~> warp -r test.wrp -i data.01 -op post.01 -pt gnuplot
```

Open the gnuplot shell:

```
AERO.201325962:~> gnuplot
```

Type the following within the gnuplot shell to make a filled contour plot of the density (post file column number 7):

```
reset

set pm3d; unset surface; set view map; set key outside; unset key; set
xlabel 'x, m'; set ylabel 'y, m'; set size ratio 0.8; set palette rgbf
ormulae 22,13,10; set cntrparam linear; set pm3d interpolate 4,4

splot 'post.01' using 1:2:7
```

### Color palettes

Traditional PM3D:

```
set palette rgb 7,5,15
```

Rainbow:

```
set palette rgbformulae 22,13,10
```

Hot:

```
set palette rgb 21,22,23;
```

Ocean:

```
set palette rgb 23,28,3
```

Grayscale:

```
set pal gray
```

Large Rainbow:

```
set palette model HSV; set palette rgb 3,2,2;
```