SKILLPILLS

Let's create some pretty plots!

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OIST

Making pretty plots 101

2D plots

3D plots

More useful stuff

Vector plots

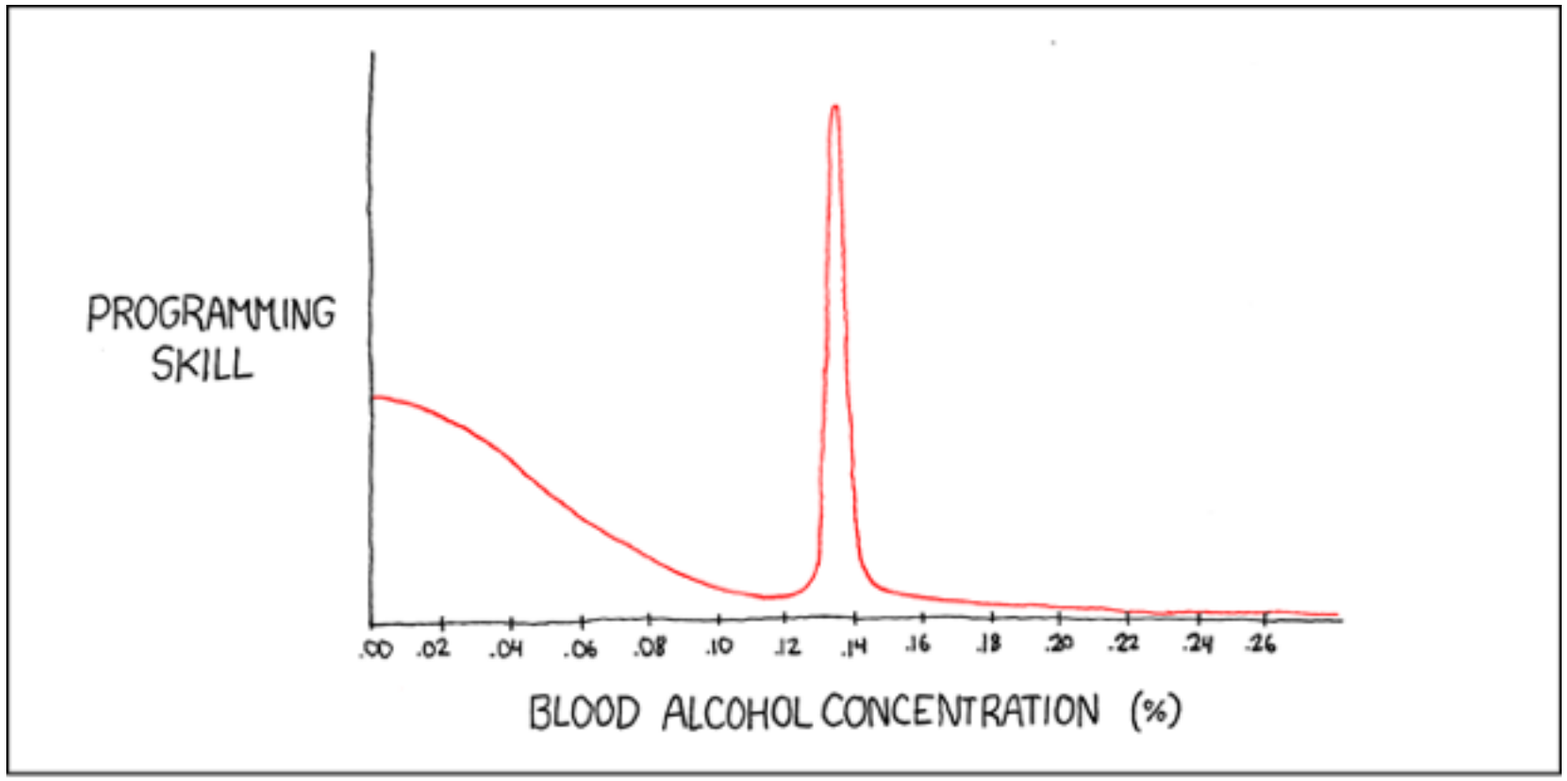
2D plots!

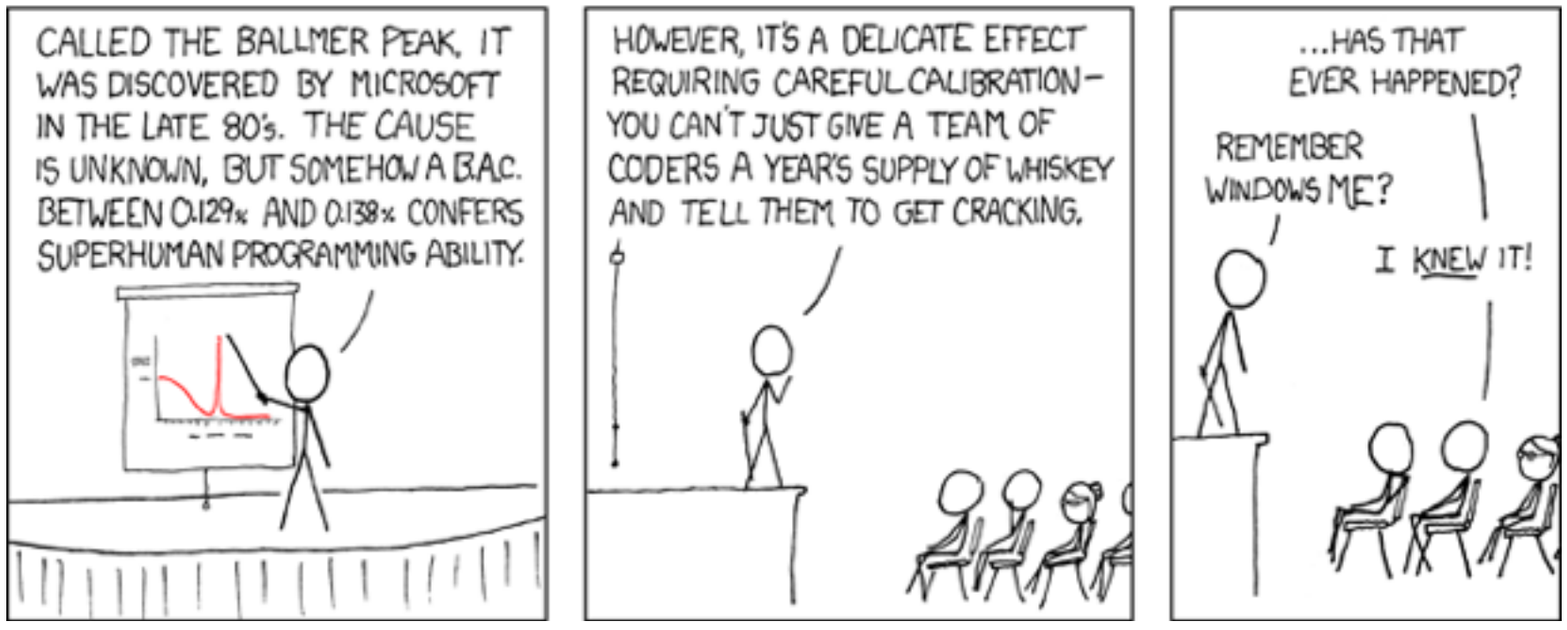
Line plots

- `plot(y)` **will plot** `y`.
- `plot(x,y)` **will plot** `y` **vs** `x`.
- `axis([xmin xmax ymin ymax])`
- We can the format of the lines/dots…
- `xlabel` **to add a label to x axis.**
- `ylabel` **to add a label to y axis.**
- `title` **to set a title.**

Reproduce Ballmer peak's plot

task 1



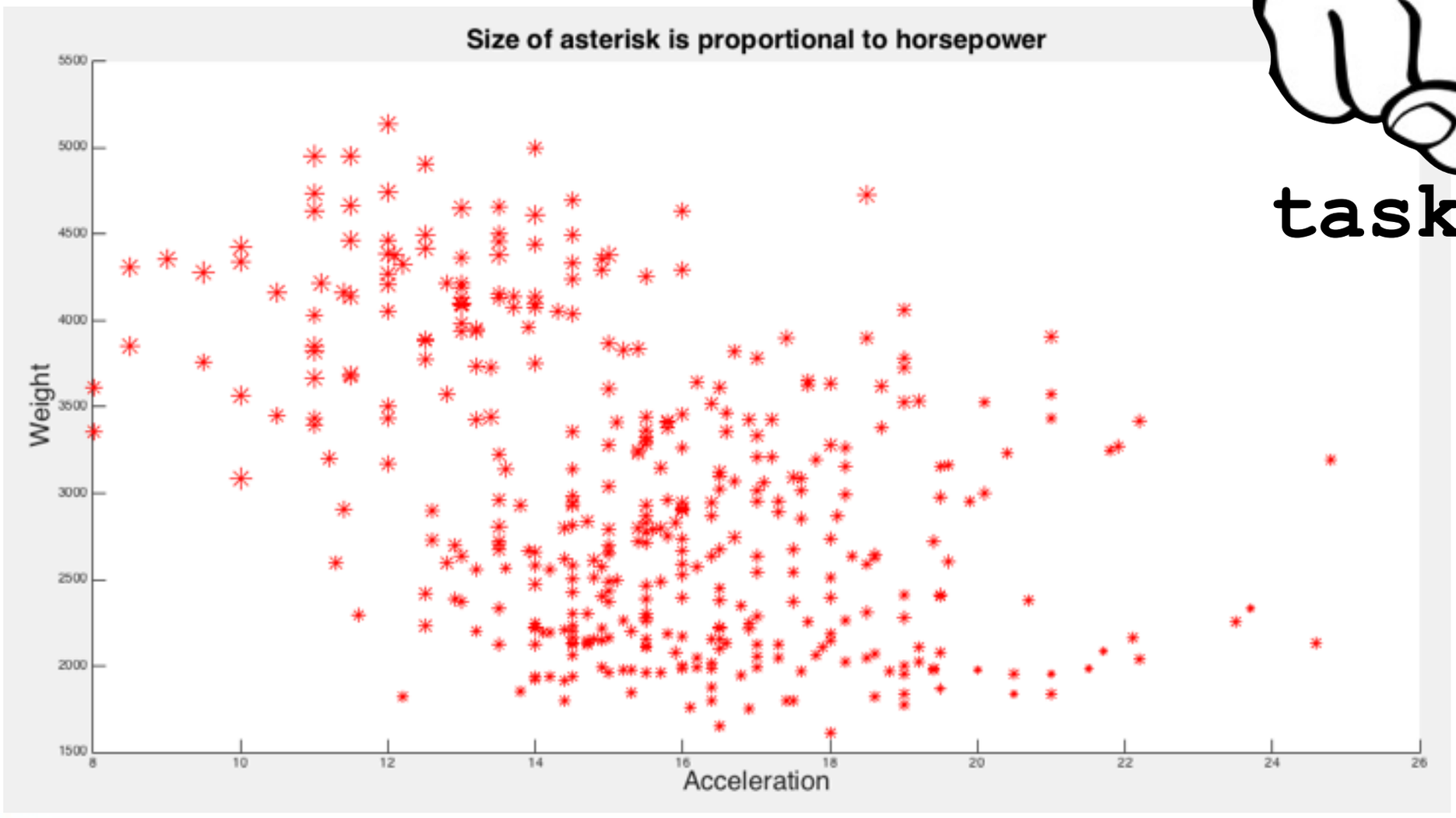


data is in ballmer.mat

My first scatter plot

- `scatter` **is used for scatter/bubble plots.**

```
load carbig.mat
help scatter
```

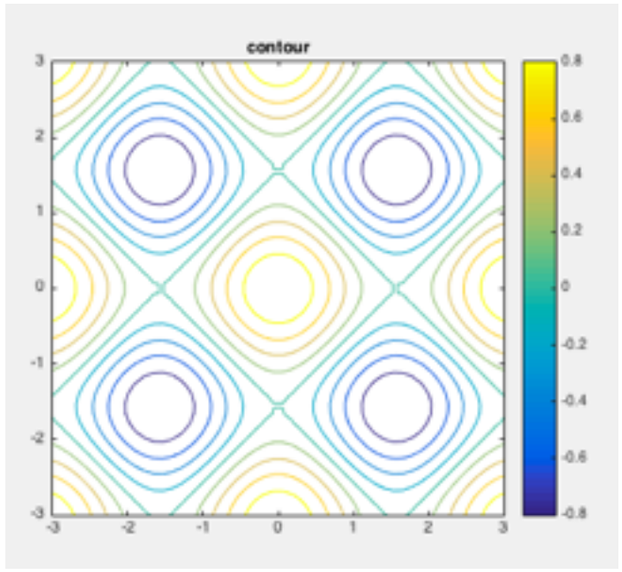


`task 2`

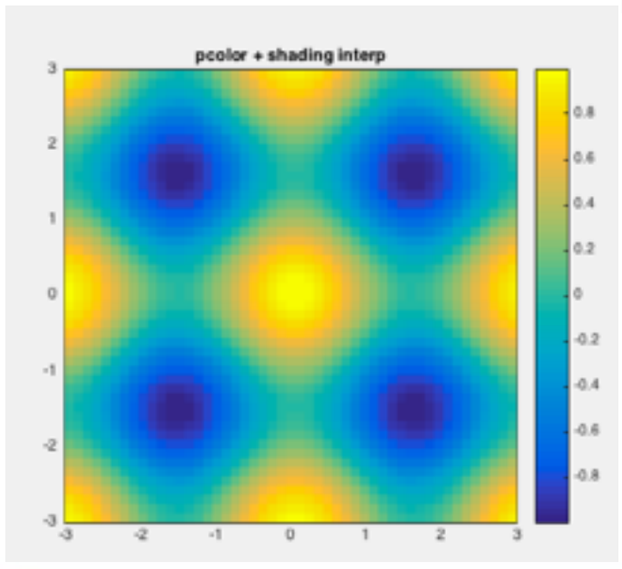
3D plots!!

3D plots

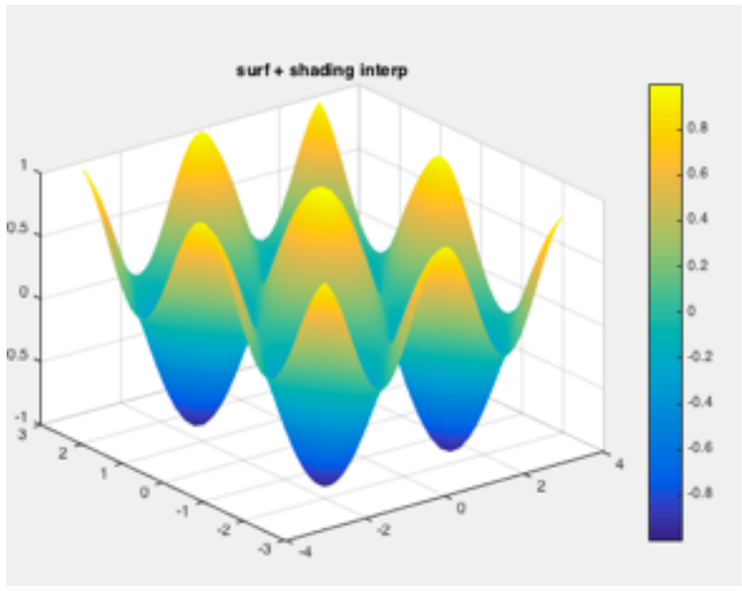
- Contour plots



- Pseudocolor plot



- Surface plots



Meshgrid for 3D plots

- To make 3D plots we need a meshgrid, a cartesian grid created from vectors:
  `[x y] = meshgrid(x_v,y_v)`

- We use `x` and `y` to create functions to plot

```
>> x_line = 1:5

x_line =

     1     2     3     4     5

>> y_line = -2:2

y_line =

    -2    -1     0     1     2
```

```
>> [x y] = meshgrid(x_line, y_line)

x =

     1     2     3     4     5
     1     2     3     4     5
     1     2     3     4     5
     1     2     3     4     5
     1     2     3     4     5


y =

    -2    -2    -2    -2    -2
    -1    -1    -1    -1    -1
     0     0     0     0     0
     1     1     1     1     1
     2     2     2     2     2
```

```
>> z = x .* y

z =

    -2    -4    -6    -8   -10
    -1    -2    -3    -4    -5
     0     0     0     0     0
     1     2     3     4     5
     2     4     6     8    10
```

Contour plots

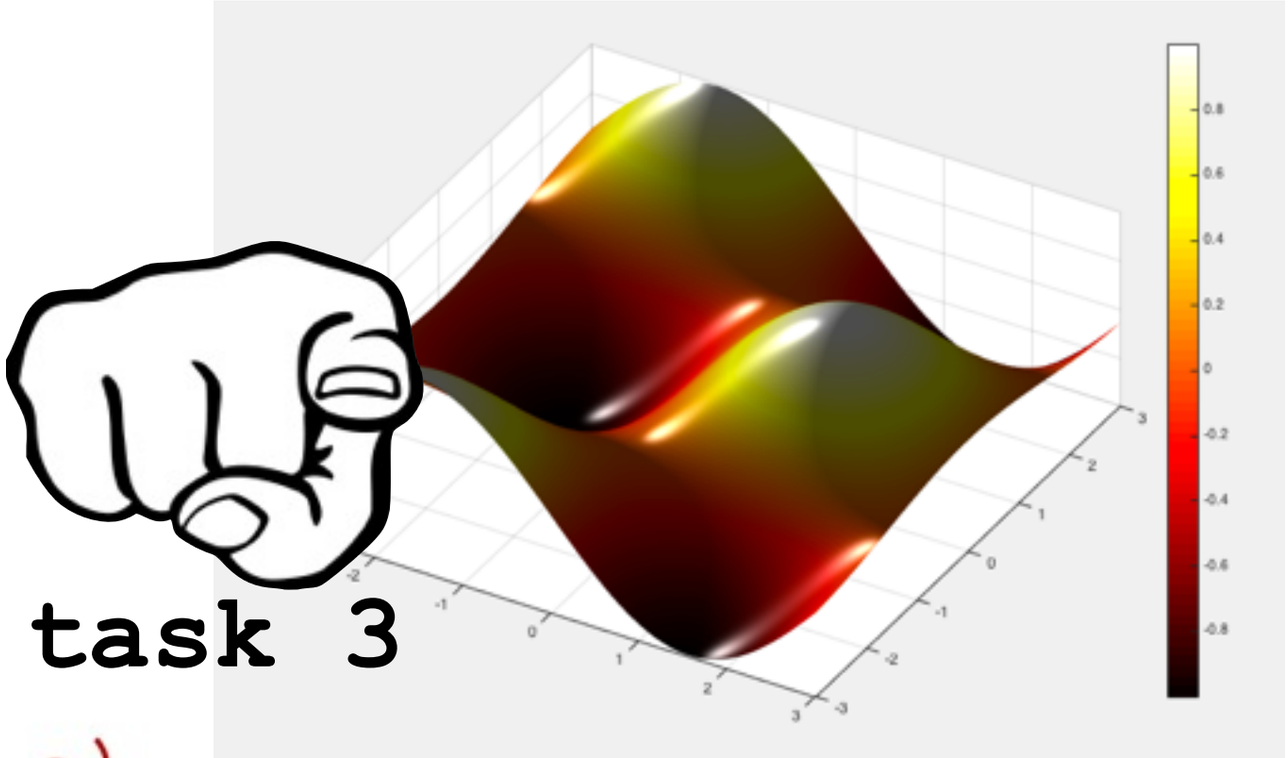
- Contour of z(x,y): `contour(x,y,z)`
- `colorbar` to show colorbar
- change colors! `colormap [jet, hot, cool, spring, winter, gray, bone, copper, pink, lines]` or `colormapeditor`
- `caxis([cmin cmax])`: colorbar range

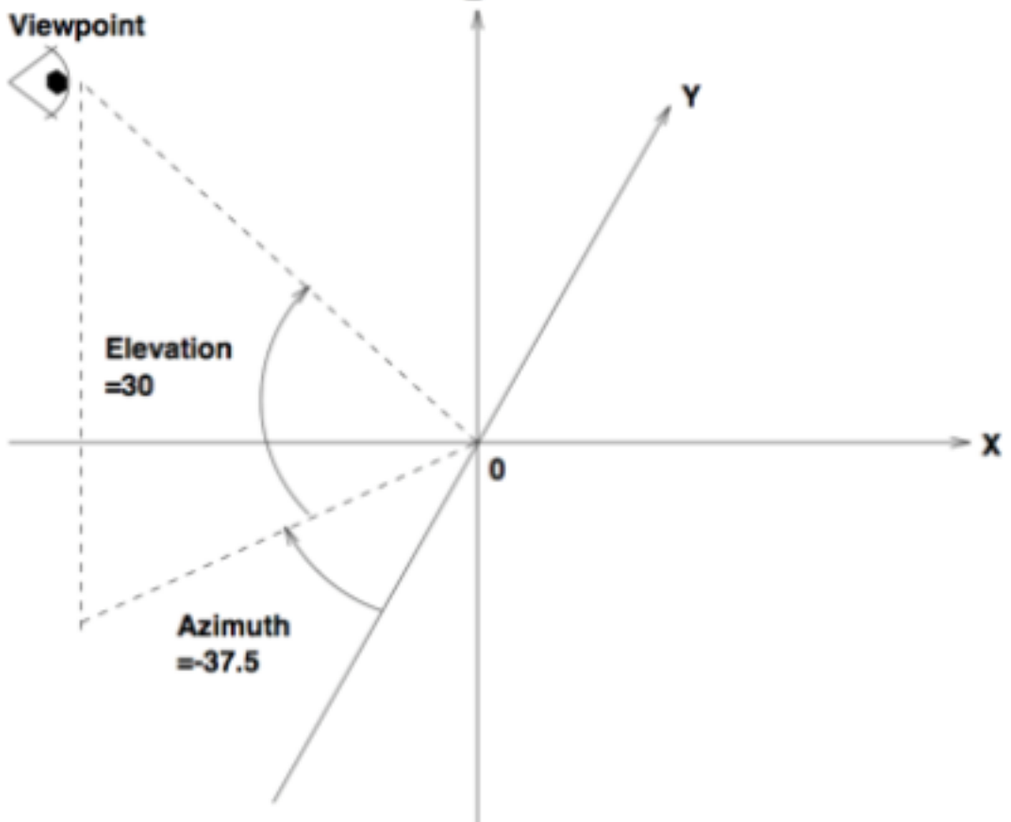
Pseudocolor plot

- Pseudocolor plot of z(x,y) works the same
  `pcolor(x,y,z)`
- We can remove the lines by using
  `shading flat`
  `shading interp` (also smoothes)

Surface plots

- They work the same: `surf(x,y,z)`
- Plot z = sin(x)cos(y) in [-3 3] x [-3 3]
- Get `help`! You can use `lightangle`, `shading`, `lighting`, `view(az,el)`



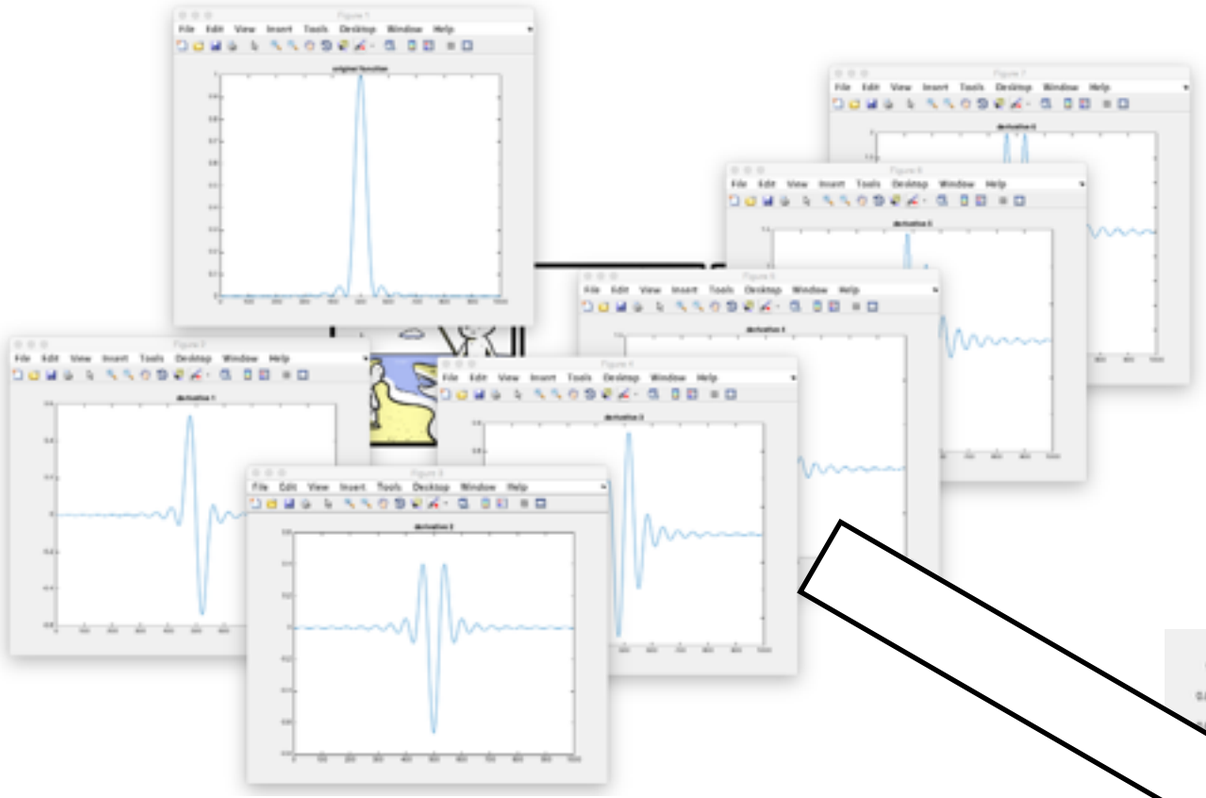


Other useful stuff...

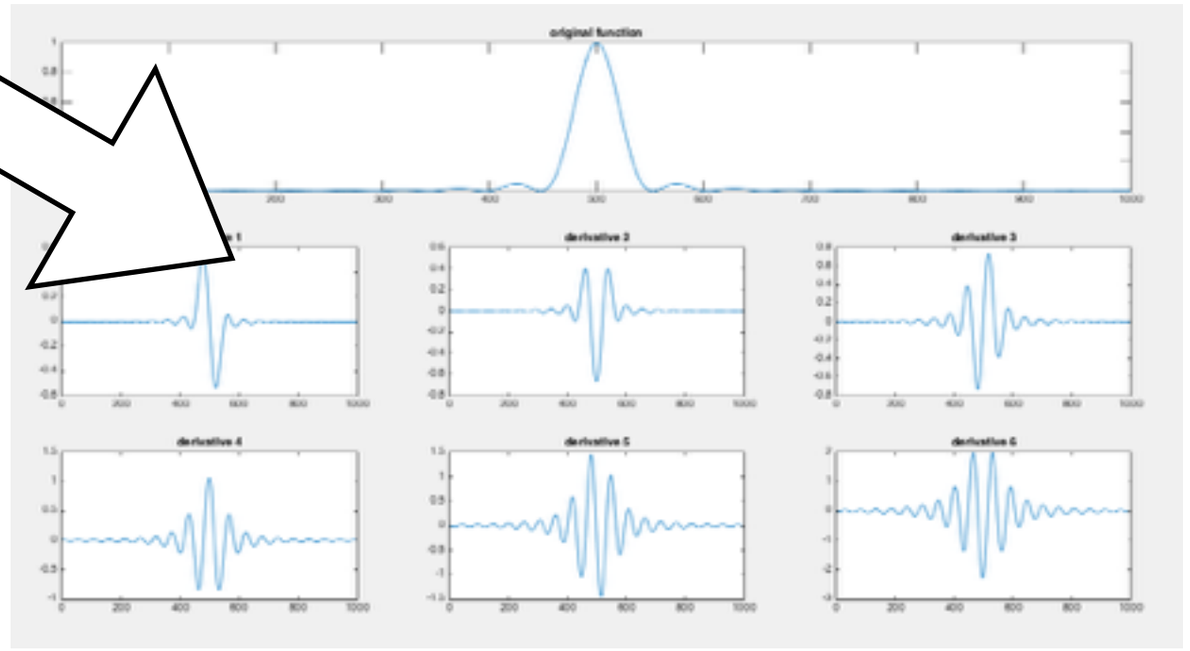
More useful commands

- `figure` makes a new figure.
  `figure(n)` goes to/creates a window for figure n.
- `clf` clears the contents of the current figure.
  `clf(n)` clears figure n.
- To put multiple plots in the same figure we can use `subplot(nr,nc,i)`.

Practice your subplotting!



task 4

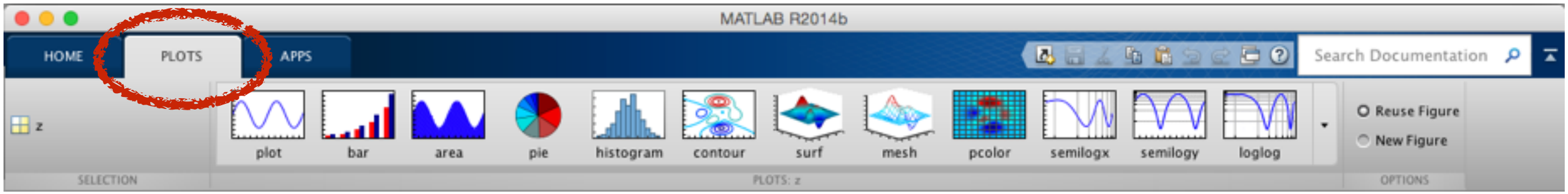


bonus points for using a for loop!

Exporting your figures

- Export figure to eps
  `hgexport(fig_n 'name.eps')`
- Export to png
  `print -dpng 'filename.png'`
- print has lots of options!
  `help print`

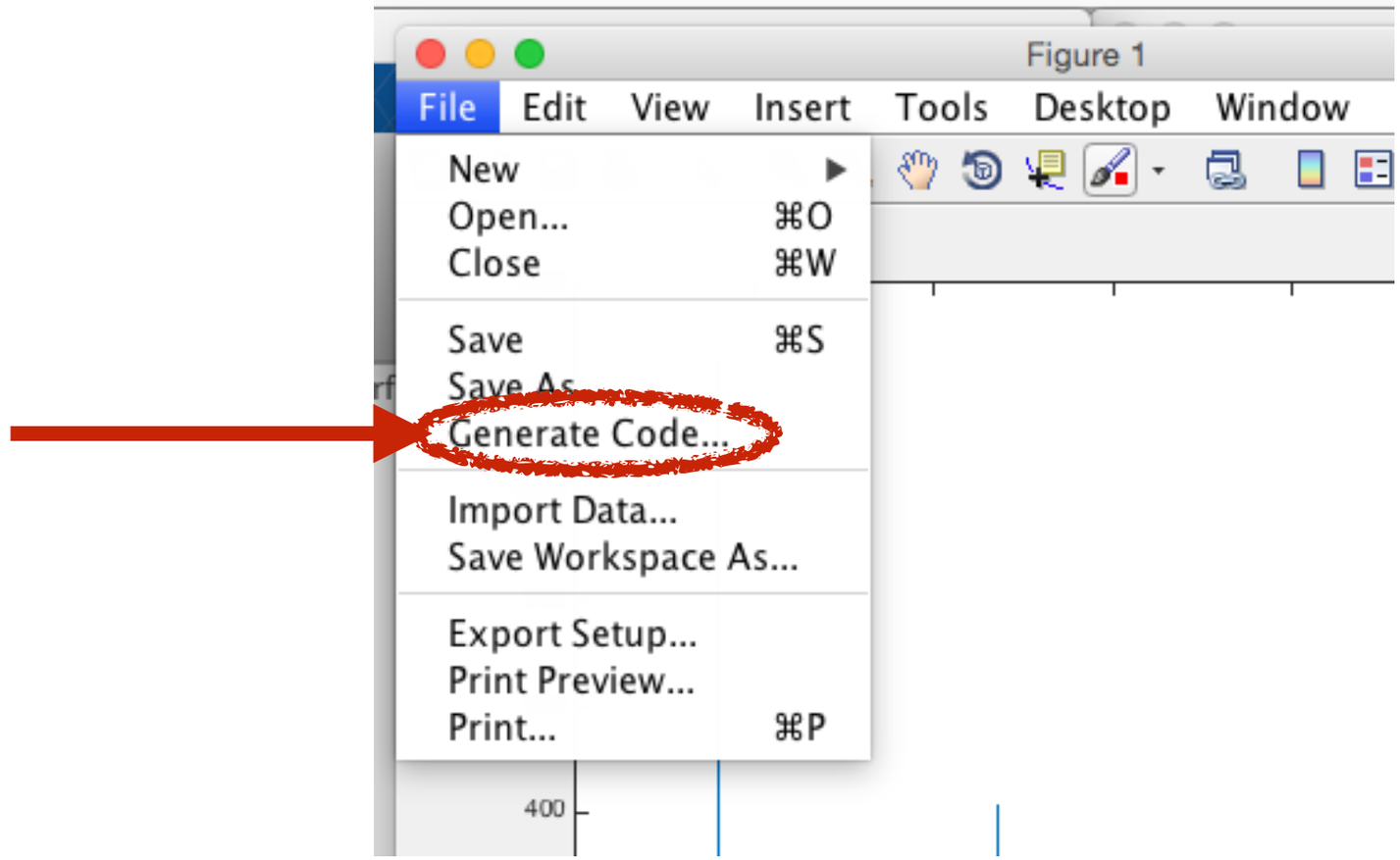
Don’t know which plot to make?



- Select some data on the workspace.
- Click PLOTS.

Make a function for your plots!

- Once your plot is ready, you can create a function to generate the same plots with different data!



(from the figure menu options)

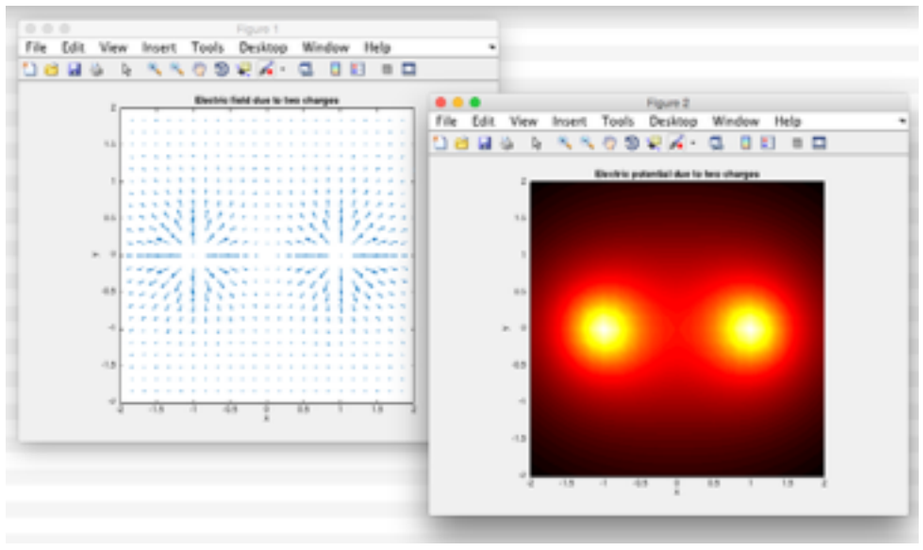
Vector plots!!!

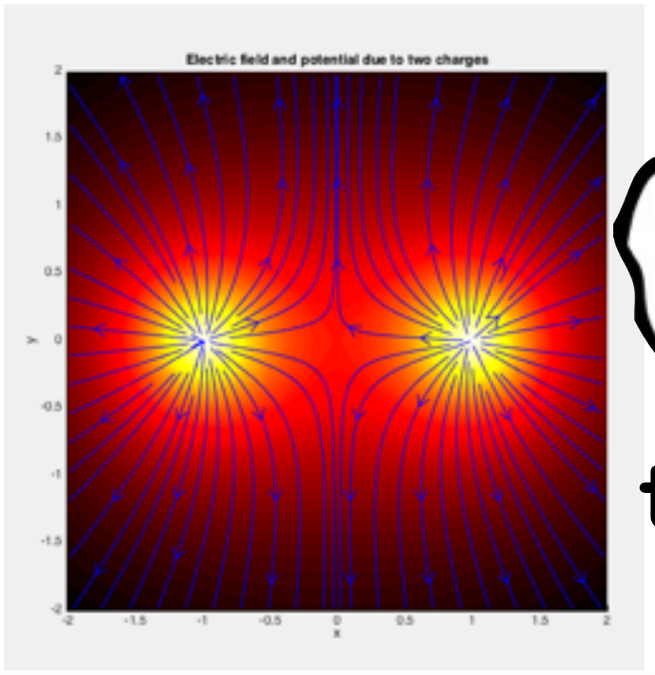
Vector plots

- `quiver(x,y,vx,vy)` shows vectors starting at `(x,y)` of lengths `(vx,vy)`
- `quiver(x,y,vx,vy,s)` can be used to scale the vector by a factor `s`.

Stream lines of vector field

- `streamslice(x,y,vx,vy)` draws streamlines with the vector field defined by the inputs.
- Create an awesome plot combining both the potential and electric field stream lines.





Happy plotting!