

The background of the slide is filled with numerous small, red and white capsules scattered across the entire area.

SKILLPILLS

**Let's create some
pretty plots!**

Albert Benseny Cases



Making pretty plots 101

SKILLPILLS

2D plots

3D plots

More useful stuff

Vector plots

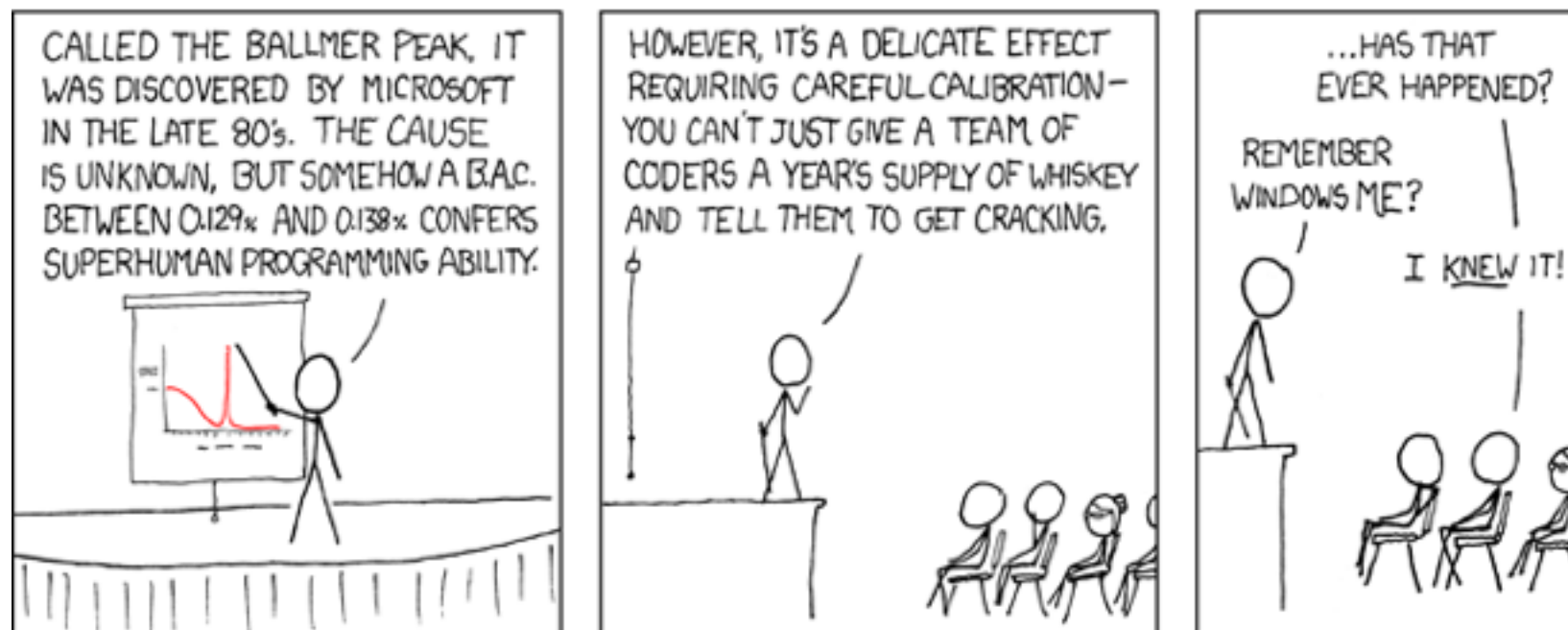
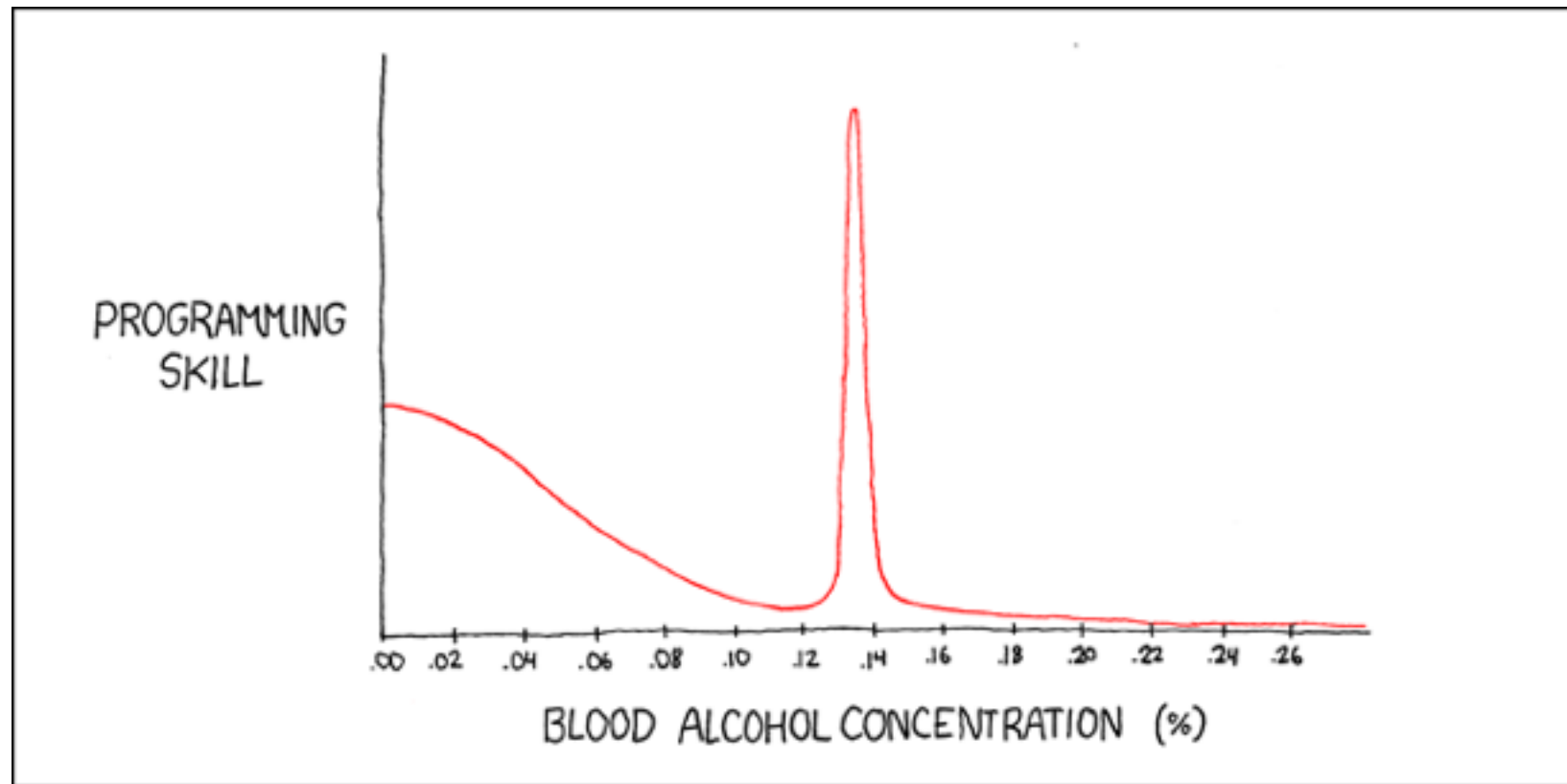
The background of the slide is filled with a dense, scattered pattern of red and white capsules, resembling a large number of data points or a complex dataset.

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

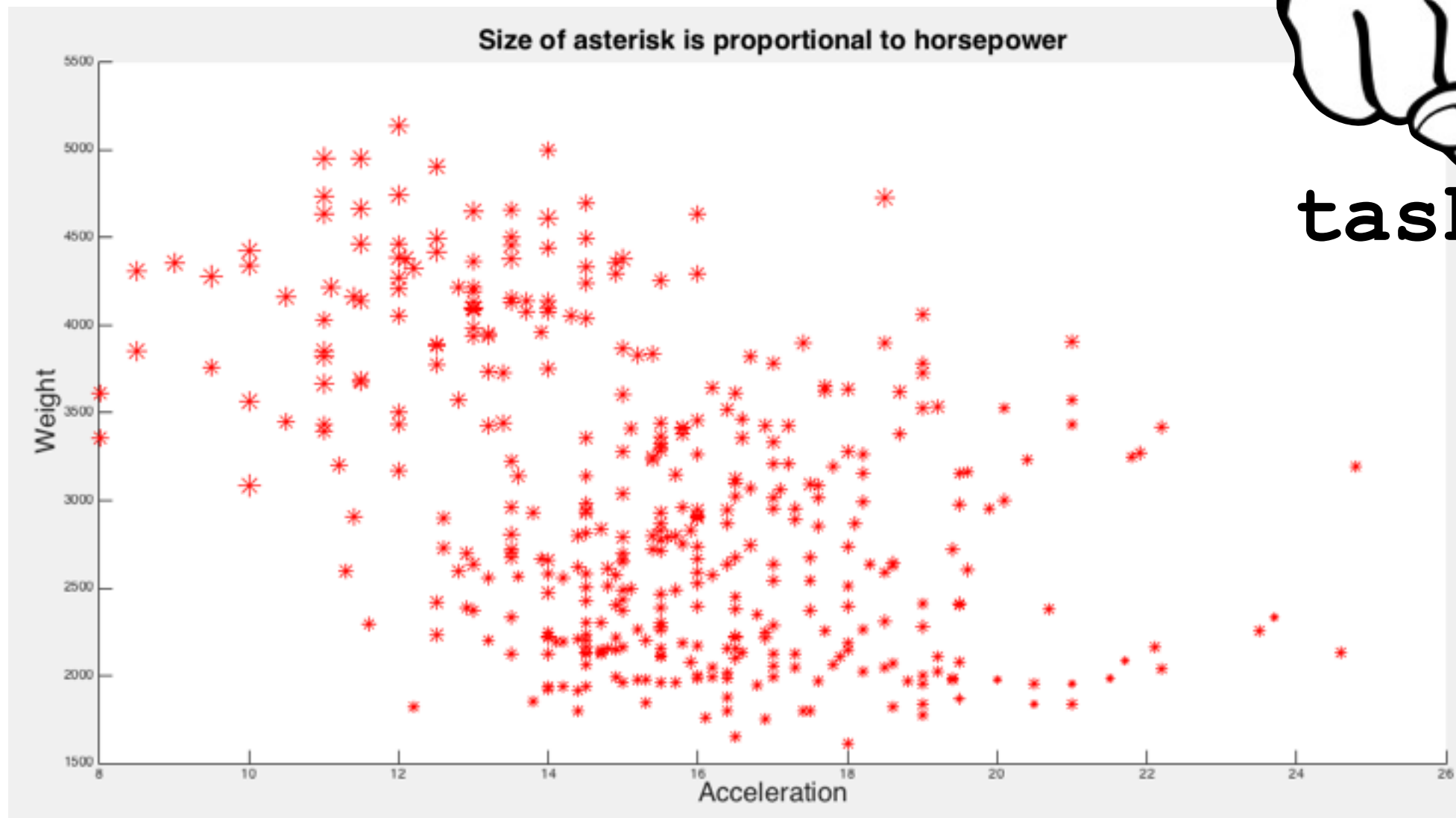


data is in ballmer.mat



My first scatter plot

- `scatter` is used for scatter/bubble plots.
`load carbig.mat`
`help scatter`

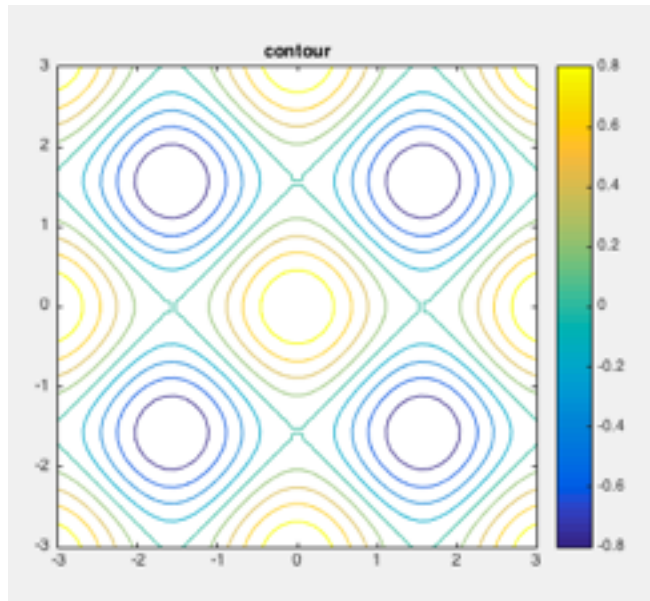


The background of the slide is filled with a dense, scattered pattern of red and white capsules, resembling a 3D visualization of data points or particles.

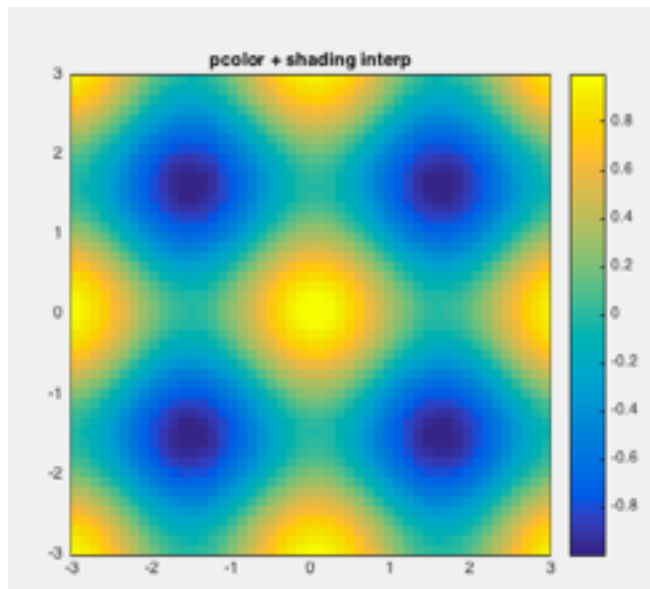
3D plots!!

3D plots

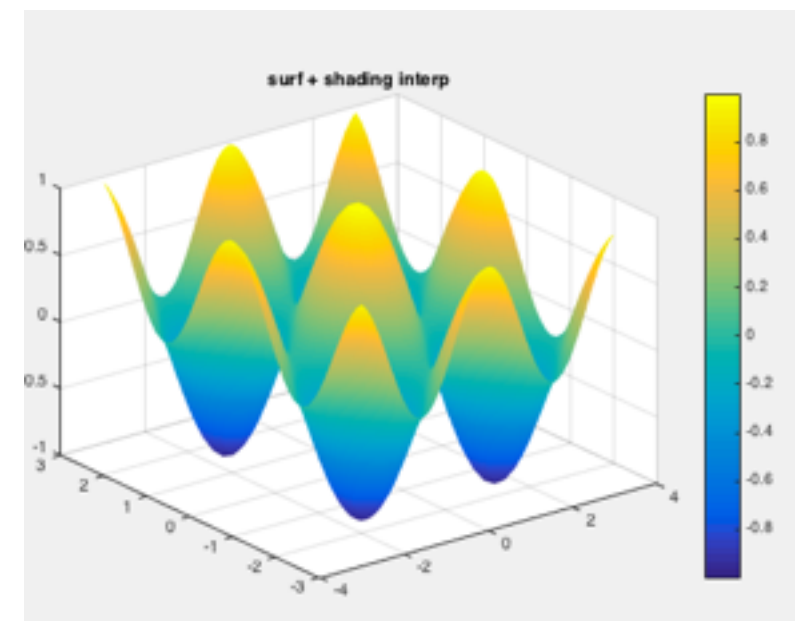
- Contour plots



- Pseudocolor plot



- Surface plots



Meshgrid for 3D plots

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

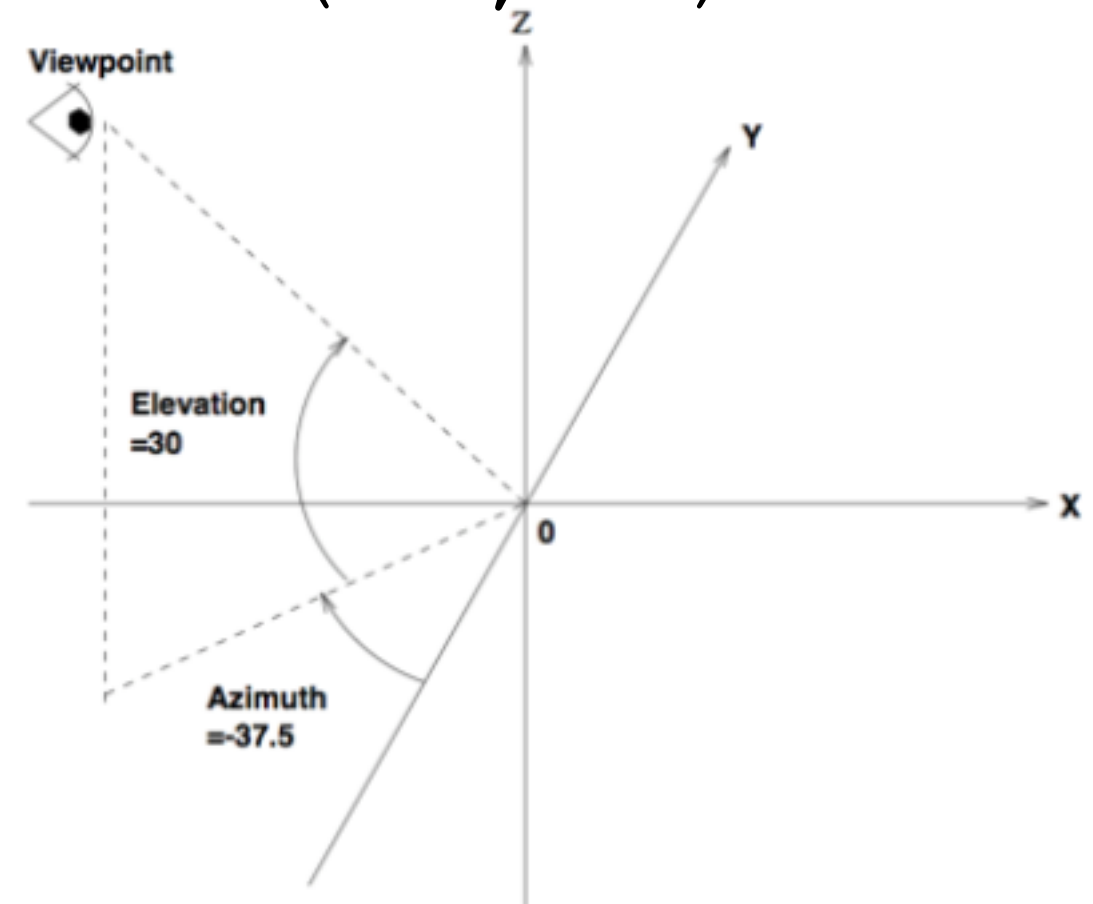
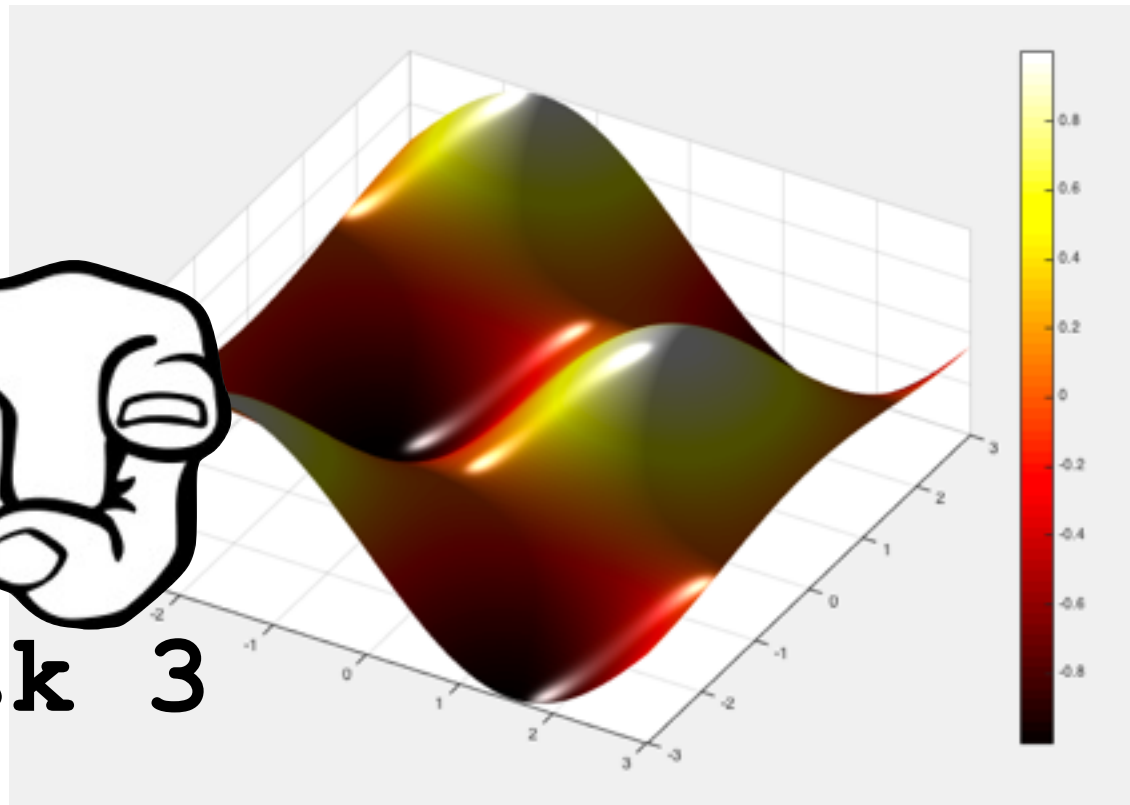
- Pseudocolor plot of $z(x,y)$ works the same
`pcolor(x, y, z)`
- We can remove the lines by using
`shading flat`
`shading interp` (also smoothes)

Surface plots

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



task 3



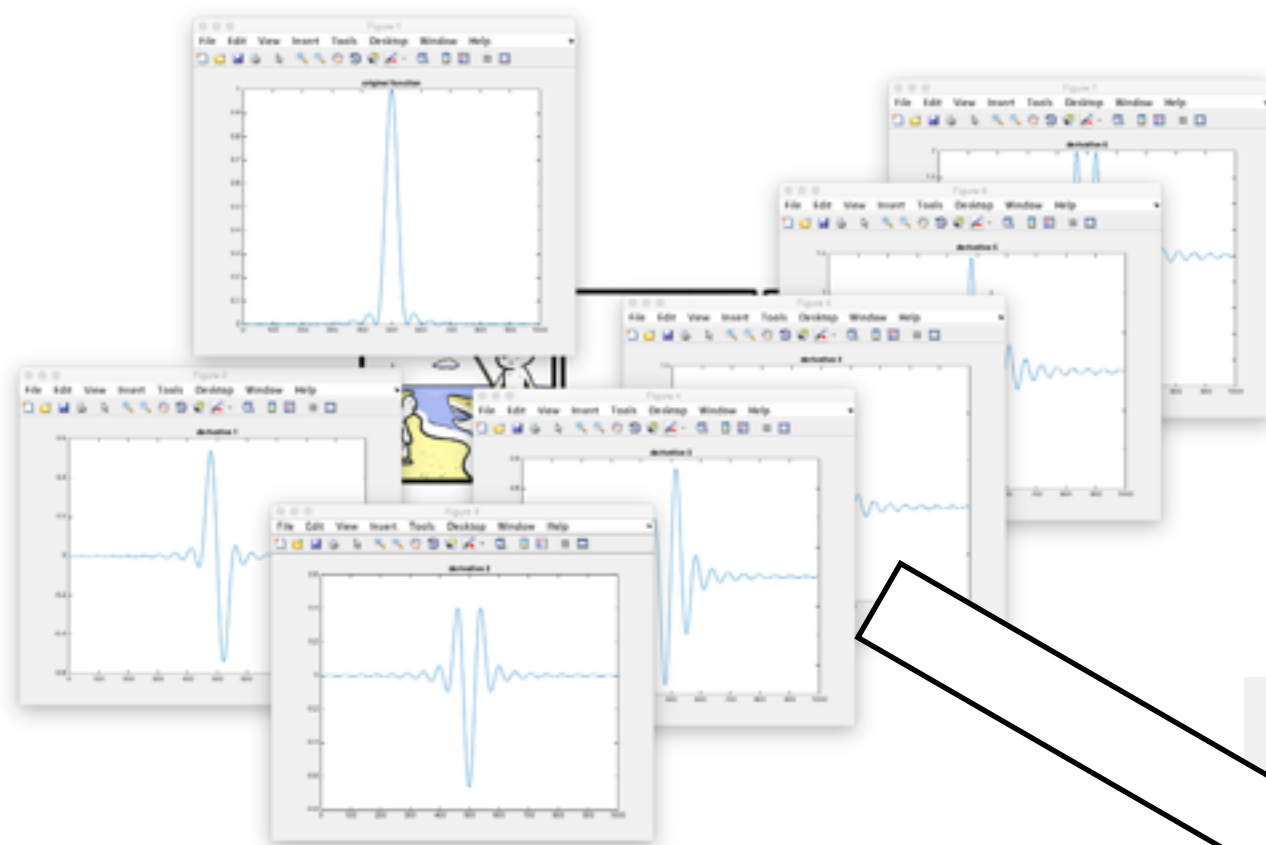
The background of the slide is filled with a dense, scattered pattern of red and white capsules, resembling a field of pills or a microscopic view of bacteria. The capsules are oriented in various directions, creating a sense of movement and abundance.

Other useful stuff...

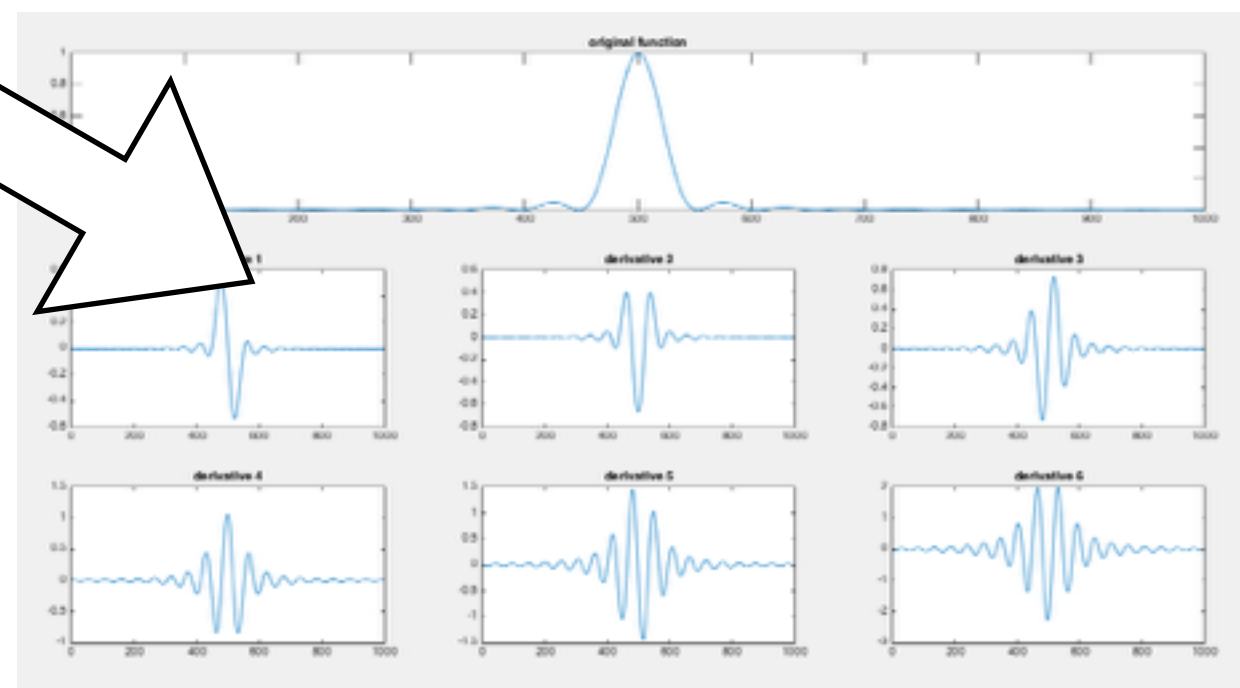
More useful commands

- `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

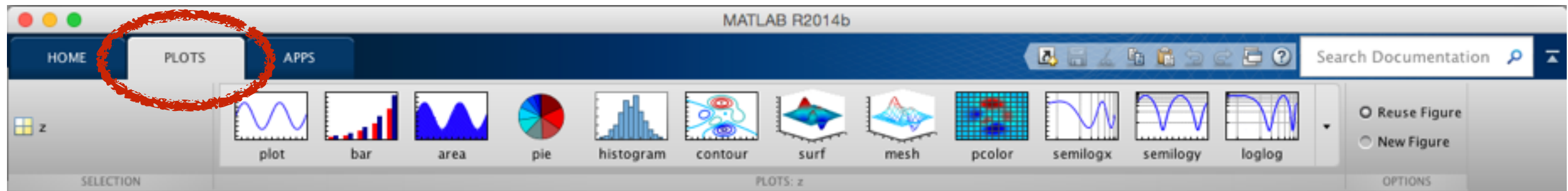


bonus points for using a for loop!

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?

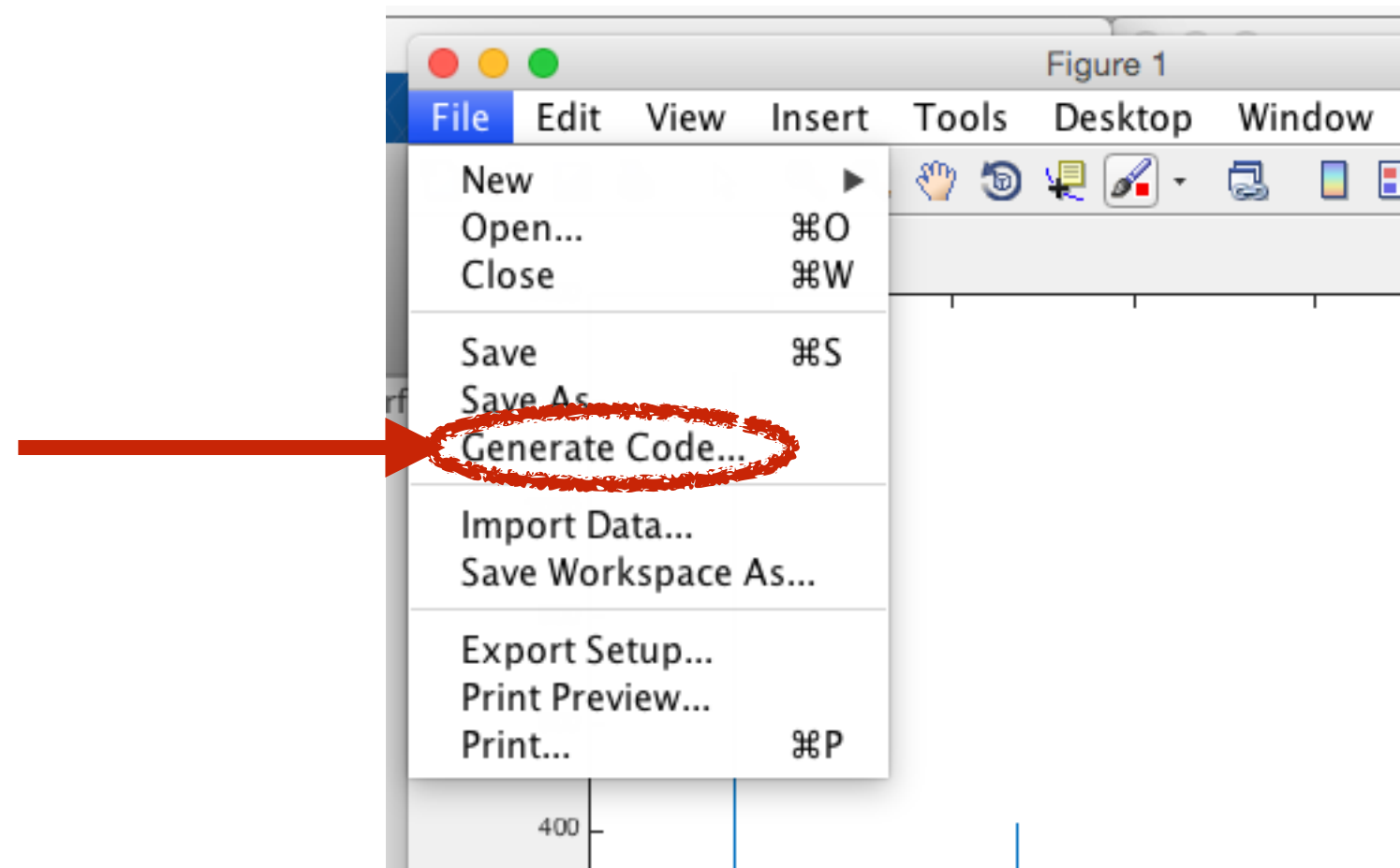


- Select some data on the workspace.
- Click PLOTS.



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)



The background of the slide is filled with a dense, scattered pattern of red and white capsules, resembling a vector field or a random distribution of points.

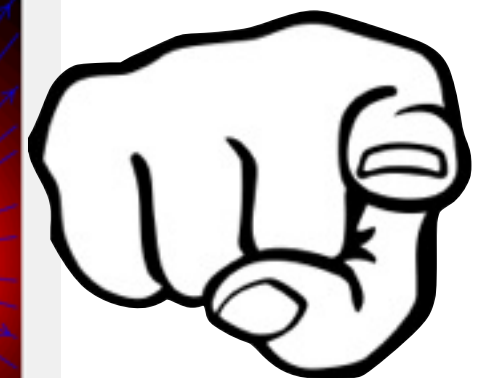
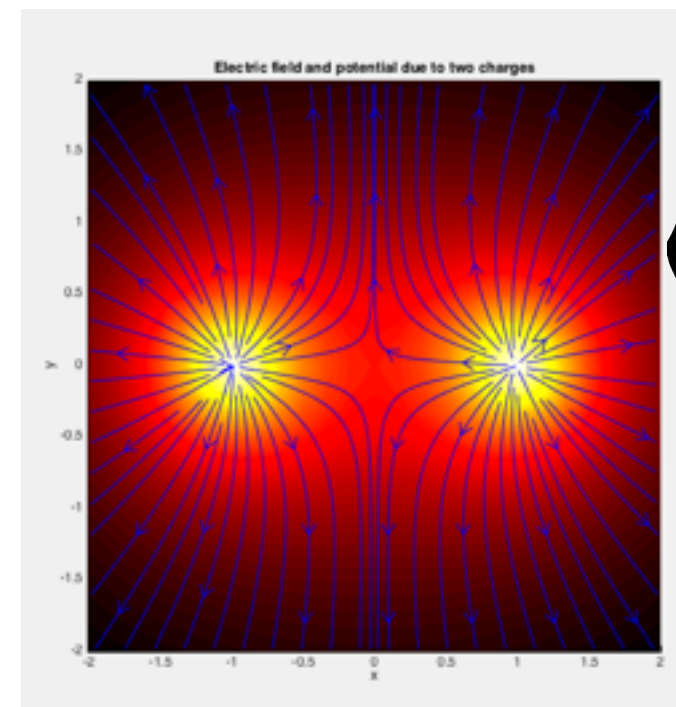
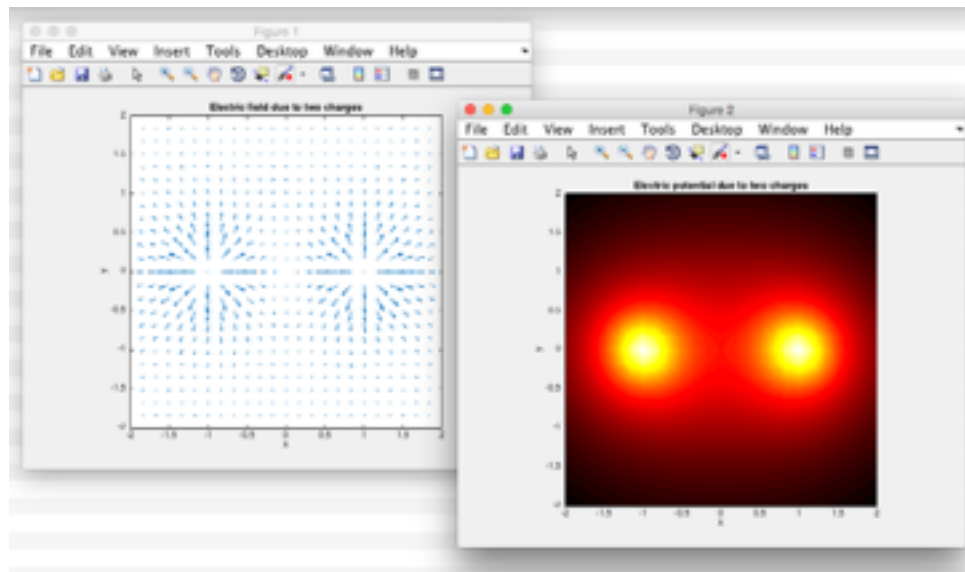
Vector plots!!!

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.



task 5



The background of the image is filled with a dense, scattered pattern of red and white capsules, resembling a shower of pills or a field of data points. The capsules are oriented in various directions, creating a sense of movement and abundance. The text "Happy plotting!" is centered over this pattern.

Happy plotting!