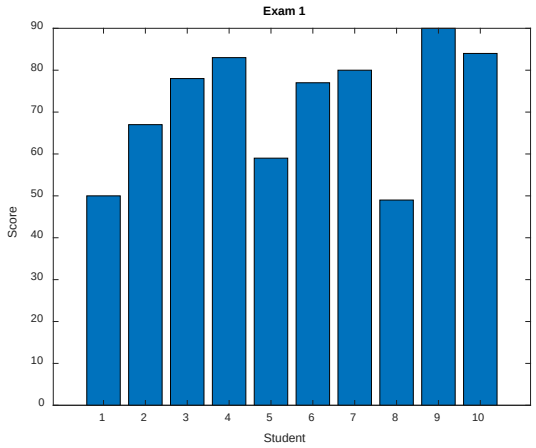
EE 224

https://www.tutorialspoint.com/matlab/matlab_plotting.htm

More plots

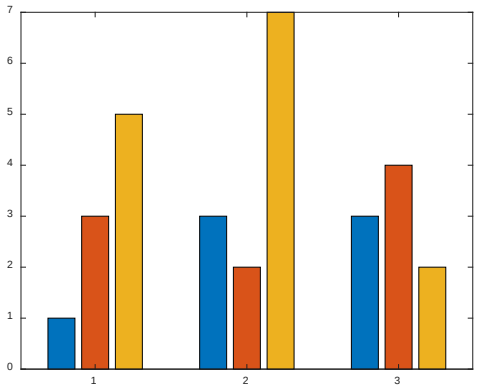
Bar chart in MATLAB

```
%BarChartExmp.m
x = [1:10];
y = [50 67 78 83 59 77 80 49 90 84];
figure(1);clf;
bar(x,y)
xlabel('Student');ylabel('Score');title('Exam 1');
```



You can also do a grouped bar chart like this:

```
figure(2);clf;
y = [1 3 5; 3 2 7; 3 4 2];
b = bar(y,'FaceColor','flat');
```



3D Plots

Consider the function given by

$g = xe^{-(x^2+y^2)}$

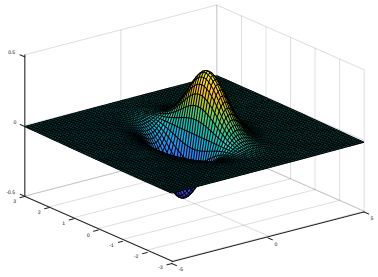
For each x-y pair in the xy plane we can calculate a value for g which can be plotted in the third dimension. To do this we first have to create a set of x and y values. This is done with the `meshgrid` function.

```
[x,y] = meshgrid(–5:0.1:5, –3:0.1:3);
```

This creates a set of xy points where x goes from -5 to +5 in steps of 0.1 and y goes from -3 to +3 in steps of 0.1.

After the meshgrid is defined we can define the function and use the `surf` function to plot the result in 3D.

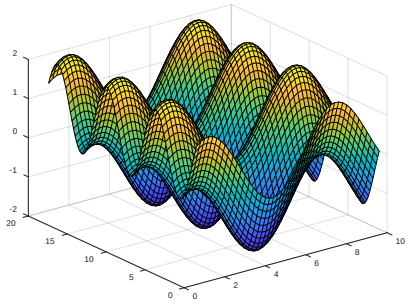
```
[x,y] = meshgrid(-5:0.1:5, -3:0.1:3);
g = x .* exp(-x.^2 - y.^2);
surf(x, y, g)
```



```
Example:
Use Surf to plot the function
z = sin(x) + cos(x)
```

Plot this on a grid that goes from $1 \leq x \leq 10$ and $1 \leq y \leq 20$ where both x and y are in steps of 0.2.

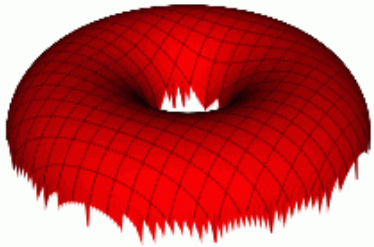
```
figure(2);clf;
[X,Y] = meshgrid(1:0.2:10,1:.2:20);
Z = sin(X) + cos(Y);
surf(X,Y,Z)
```



Other 3D function examples from:
`https://www.benjoffe.com/code/tools/functions3d/examples`

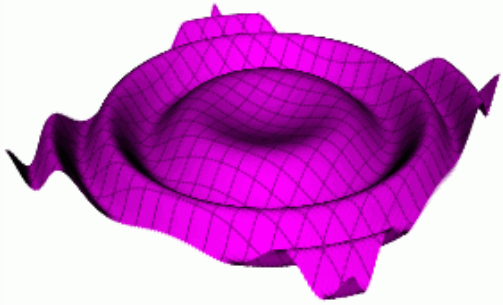
Torus

(0.4^2-(0.6-(x^2+y^2)^0.5)^2)^0.5



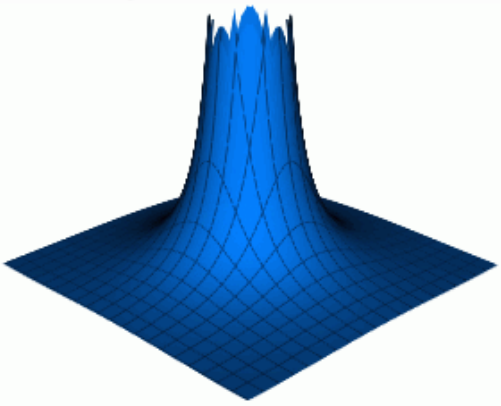
Ripple

sin(10(x^2+y^2))/10



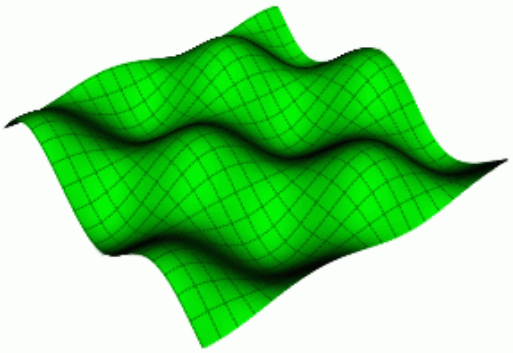
Tube

1/(15(x^2+y^2))



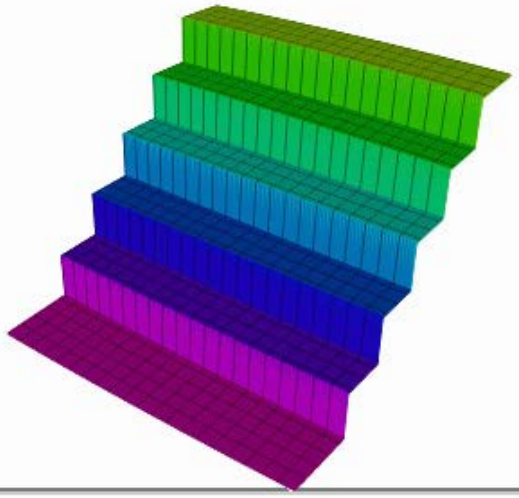
Bumps

sin(5x)*cos(5y)/5



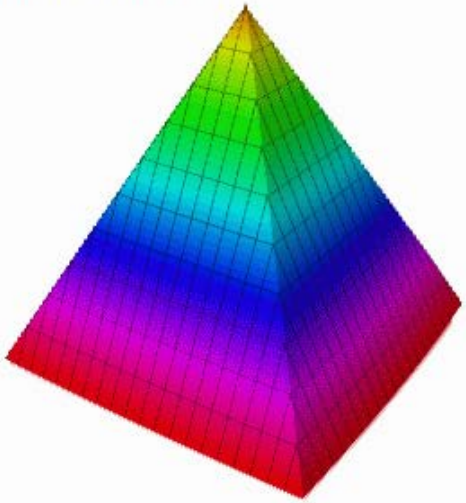
Stairs

(sign(-.65-x)+sign(-.35-x)+sign(-.05-x)+sign(.25-x)+sign(.55-x))/7



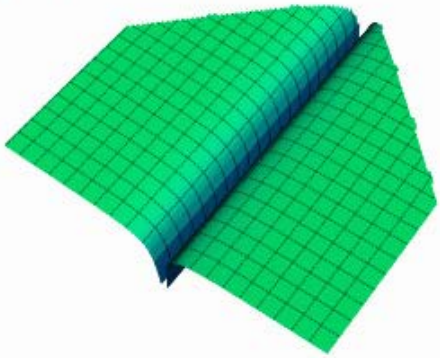
Pyramid

1-abs(x+y)-abs(y-x)



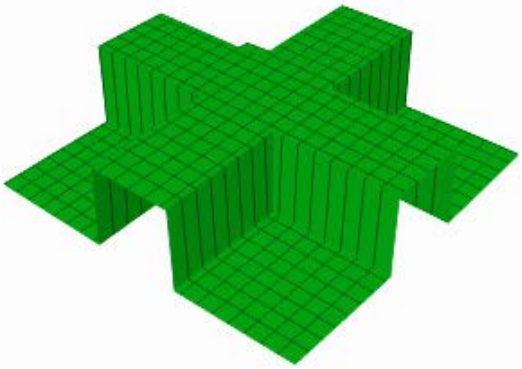
Paper Plane

sign(x) * atan(x*80)/6 * sign(-y-x+1) * sign(-y+x+1)*5 - 1.01

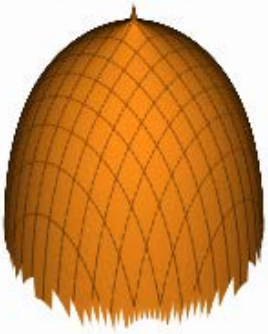


Green Cross

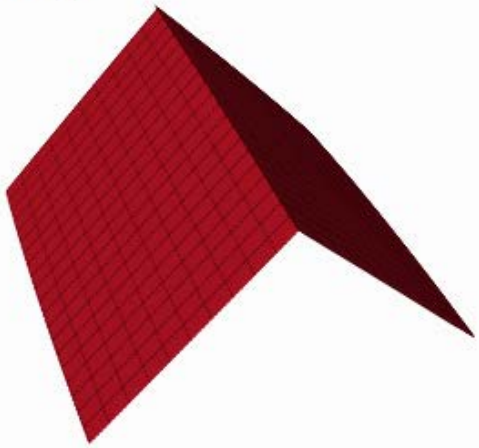
.1 - sign(sign((x*12)^2-9)-1 + sign((y*12)^2-9)-1)/2



.7/log(x^2+y^2)+.6

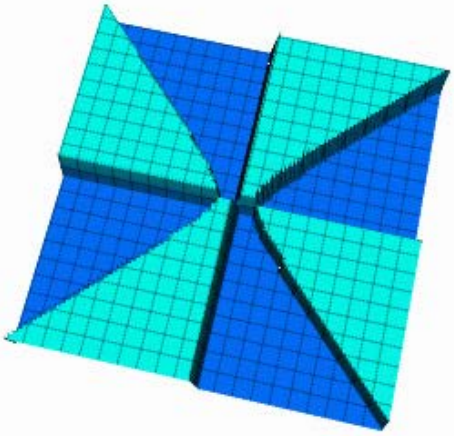


1-abs(y)



Windmill

sign(x*y) * sign(1-(x*9)^2+(y*9)^2)/9



Floppy Disc

(1-acsc((x*4)^2+(y*4)^2))/1000