Random Web

N web pages

N-by-N Link Array A

A(i,j) is 1 if there is a link on webpage j to webpage i

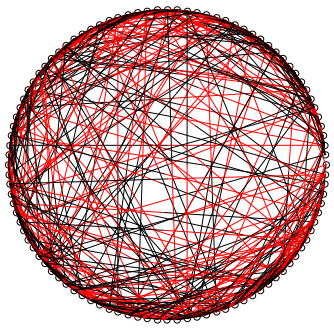
Generate a *random* link array and display the connectivity

Random Link Idea

A(i,,j) = 1 with probability $\frac{1}{1+|i-j|}$

Intuition:

More likely to be a link if i is close to j



Each line is black as it leaves page j, red when it arrives at page i

New Problem

Visualizing a function of the form

z = f(x,y)

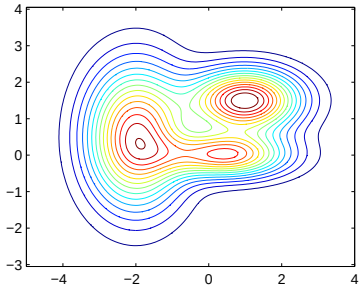
Think of z as an elevation which depends on the location; coordinates x and y describe the location

Sample Elevation Function

```
function z = Elev(x,y)
% A function with peaks at (1,1.5), (-2,.5), and (.5,0)
% Peak heights are 100, 90, and 80 resp.

 r1 = (x-1)^2 + 3*(y-1.5)^2;
 r2 = 2*(x+2)^2 + (y-.5)^2;
 r3 = (x-.5)^2 + 7*y^2;
 z = 100*exp(-.5*r1) + 90*exp(-.3*r2) + 80*exp(-.4*r3);
```

Its Contour Plot



Making a Contour Plot

```
x = linspace(-5,4,200);
y = linspace(-2.5,6.5,200);
A = zeros(200,200);
for i=1:200
  for j=1:200
    A(i,j) = Elev(x(j),y(i));
  end
end

contour(x,y,A,15)
```

- Set up a matrix of function evaluations
- Use the built-in function contour
  - The last argument (15) is the number of contour lines

General Set-Up

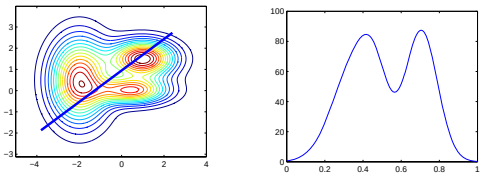
```
function A = SetUp(f,xVals,yVals)
Nx = length(xVals);
Ny = length(yVals);
A = zeros(Ny,Nx);
for i=1:Ny
  for j=1:Nx
     A(i,j) = f(xVals(j),yVals(i));
  end
end
```

Calling SetUp

```
x = linspace(-5,4,200);
y = linspace(-2.5,6.5,200);
F = SetUp(@Elev,x,y);
```

- Not just 'Elev'
  - The @ is required for function parameters
  - Without @, Matlab attempts to call the function

Generating a Cross Section



Enter endpoints via **ginput**
Sample Elev(x,y) along the line segment

Mouse Input via ginput

```
[a,b] = ginput(2);
plot(a,b)
```

- [a,b] = ginput(n) puts the mouseclick coordinates in length-n arrays a and b.
- The plot statement draws the line segment connecting (a(1),b(1)) and (a(2),b(2))

Determining Elevations along the Line

```
n = 100;
t = linspace(0,1,n);
x = linspace(a(1),a(2),n);
y = linspace(b(1),b(2),n);
for i=1:n
        % At "time" t(i) we are at (x(i),y(i)).
        % Compute elevation at time t(i).
        f(i) = Elev(x(i),y(i));
end
figure
plot(t,f)
```