Quiz 10
Due: Beginning of class, Tuesday April 22

1. Write a Matlab function,

```
function Used=bestdir(X,Y)
%  function Used=bestdir(X,Y)
%  Determines the column of X that is best aligned
% with the columns of Y.  Returns that index in "Used"
```

For programming, assume that X is $n \times r$ and Y is $n \times s$. We want to assume that Y has multiple columns, so compute the matrix

$$A_{ij} = \cos^2(\theta_{ij})$$

where θ_{ij} is the angle between column i of X and column j of Y (thus, A should be $r \times s$ instead of $r \times 1$ if Y contains only one column). With that matrix, the best column of X will be:

```
[val,Used]=max(sum(A.*A,2))
```

Careful! You may have to separate out the case if A is $r \times 1$ (otherwise the sum will actually sum your vector instead of returning a vector).

You may test this function after finishing the script file `olsTest1.m`, which is on our class website.

After you've finished, publish `olsTest1.m` to HTML and print the result- Be sure you're printing out the matrix X at each stage.

2. Write a function, `function [C,W,b,spr]=convertNet(net)` which takes the network constructed by newrb (or newrbe), and returns the parameters of interest for the RBF:

If n is the dimension of input X, m is the dimension for Y, and we have k centers:

- The matrix C is the matrix of centers, $k \times n$
- The matrix W is the matrix of weights, $k \times m$
- The vector b is the (row) vector of biases, $1 \times m$
- `spr` is the σ in our Gaussian (see rbf1.m, we use a scalar).

To check yourself, use the script file `convertTest.m` that is online (and also helps define what the parameters ought to do). The outputs should be the same- When you're finished, publish this to HTML and print.