

CIEG 675

Homework #2 Due **Tuesday September 18, 2007**

In a m-file do the following and verify it works by copy and pasting into the command window or running your m-file.

- 1) Develop a 5 x 5 matrix that consists of all 5's except has a 1 in the center.
- 2) Define two row vectors that each contain values 1 through 4. Multiply them element-wise.
- 3) Figure out a way to multiply the two vectors from above non-element-wise without redefining the variables.
- 4) Develop a 3 x3 matrix with elements ranging from 1 to 9. Then perform the following calculation: Add 40 to it, divide element wise by 7, subtract 2 from it, take the square root of the result then take the exponential of that. Do all this math in one line of code.
- 5) For a period of 10 seconds and an amplitude of 1, develop a variable that consists of a sine wave of 2 periods where data is determined every tenth of one second.
- 6) From your knowledge of linear algebra and the following data, determine the coefficients, p, of the least squares fit of a plane through the data defined as  $data = p(1) + p(2)*x + p(3)*y$ .

```
x=1:10;
y=x;
[X,Y]=meshgrid(x,y);
X=X(:); % turns the matrix into a long vector instead;
Y=Y(:); % turns the matrix into a long vector instead;
data=cumsum(ones(10,10))+(1-rand(10,10)); % elevation data
data=data(:); % turns the matrix into a long vector instead;
```

- 7) From your knowledge of linear algebra, take the vector that goes from (0,0) to (1,1) and rotate it counterclockwise through an angle of 45 degrees.