

EE 251: Homework 7

All programs must be emailed. Please follow the following steps

1. It is probably easier if you create a directory for each homework set, e.g., `hw8`
2. Name each problem as `prob_x.y.m`, where `x` is the problem number and `y` is the subproblem if any, e.g., `prob_1.a.m`. If there are no subpart to the problem then just use the format `prob_x.m`
3. Zip all the files (or the directory for that homework if you made one) using the following command

```
tar -czvf lastname_firstname_hw8.tar.gz prob_1.c prob_2.a.c
```

or if you put all the files for a particular homework in its own directory

```
tar -czvf lastname_firstname_hw8.tar.gz hw8
```

Don't forget to change `lastname_firstname` with your last and first name

4. Email me you .tar.gz file with EXACTLY the following as the subject

```
spring 2015 ee251 hw8
```

1. Write MATLAB code to generate the following signal

$$x(t) = A \cos(2\pi F_1 t) \cos(2\pi F_2 t)$$

where $A = 2$, $F_1 = 1\text{Hz}$, and $F_2 = 20\text{Hz}$.

- (a) Generate data for 4 seconds with the spacing in the time vector to be 0.001 seconds.
- (b) Plot $x(t)$ and label all axis.
- (c) Generate a second plot on which you plot $x(t)$ and on the same figure plot

$$y(t) = A \cos(2\pi F_1 t)$$

Make sure you add legends and labels to all axis

2. Using MATLAB generate a row vector with 1000 random numbers using a Gaussian distribution with a mean of 2 and standard deviation of 4.
 - (a) Plot the generate numbers
 - (b) Sort and plot the generated numbers
 - (c) Compute the mean and standard deviation. Does it match what you designed it for.?
 - (d) Generate a histogram of the generated numbers
3. Using MATLAB multiply the following the corresponding elements in the following two vectors

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}, \quad \begin{pmatrix} 4 \\ -2 \\ 0 \end{pmatrix}$$

4. Using MATLAB compute the inverse A given by

$$A = \begin{pmatrix} 1 & 2 & -6 \\ 3 & 2 & 1 \\ 9 & 4 & 5 \end{pmatrix}$$

What should $A * A^{-1}$ be equal to? Using MATLAB to compute $A * A^{-1}$ what do you get? why?