EE342 **Problem Set #1** **Spring 1999**

Due F 01/29/99

1. Use matlab's stem function to plot the following discrete-time signals for $-5 \le n \le 10$. Use subplot to place all four plots on one page.
   a) $x[n] = 0.5u[n]$
   b) $x[n] = 2r[n]$ where $r[n]$ is the discrete-time unit ramp
   c) $x[n] = 3\delta[n]$
   d) $x[n] = (0.9)^n p_7[n]$

2. Use matlab's stem function to plot the following discrete-time signals for $-5 \le n \le 5$. Use subplot to put both plots on one page.
   a) $x[n] = 2u[n+2] - 4u[n] + 2u[n+1]$
   b) $x[n] = (n+2)u[n+3] - (1+n)u[n+1] - u[n-1] - 2^{n+1}u[n-2] + 2\ 2^n u[n-3]$

3. Rewrite the signals of problem 2 in the form $x[n] = x_1[n](u[n-n_1] - u[n-n_2]) + x_2[n](u[n-n_3] - u[n-n_4])$ where the $x_i[n]$ are functions being turned on and off by step functions.

4. Determine if the following discrete-time signals are periodic. If periodic find their fundamental period. Plot them for $0 \le n \le 25$ to verify your conclusions.
   a) $x[n] = \cos(15n - 0.15)$
   b) $x[n] = \sin(4.1\pi n)$
   c) $x[n] = \sin(2\pi^2 n + 0.31)$

5. Sample the following continuous-time signals every $T = 0.4$ seconds to get a discrete-time signal $x[n]$. Write the expression for $x[n]$ and then plot $x[n]$ versus $t = nT$ on the same axes as $x(t)$ for $0 \le t \le 10$ seconds.
   a) $x(t) = \cos(4t) + \sin(3t)$
   b) $x(t) = 2u(t) - 2u(t-5)$