Math 222, Spring 2016.

Present your work in an organized fashion. Make sure that your work is algebraically correct and logically sound. Show all your work. Discussion (if necessary) with others is encouraged, while copying other's solution is a violation of NJIT student honor code. Do not forget that you should also be able to do (but not hand in) the homework problems listed on the syllabus.

MATLAB Project 1, due in the week of Feb 22, 2016.

Consider the initial value problem

$$y' = r(t)y - \frac{1}{5}, \quad y(0) = y_0, \qquad \text{where } r(t) = (1 + \sin(t))/5.$$

1. (a) Use dfield (Java version) or dfield8 (Matlab version) to plot the direction field of the differential equation with the Display window set for $0 \leq t \leq 10$ and $0 \leq y \leq 2$. Set the window properties to use arrows when displaying the direction field. Print out your plot, it is the answer to this part of the problem.

   (b) Use dfield (Java version) or dfield8 (Matlab version) to plot solutions of the initial value problem for $0.5 \leq y_0 \leq 1$ with increment of 0.1 (that is $y_0 = 0.5,\ 0.6,\ 0.7,\ 0.8,\ 0.9,\ 1.0$).

2. Use forward Euler's method with step size $h = 0.025$, $h = 0.05$, $h = 0.1$ and $h = 0.2$ to find approximate values of the solution on the interval $0 \leq t \leq 5$ for $y_0 = 0.5$ and $y_0 = 1$.