ChE/MSE 505
Midterm Examination
Administered: Friday, October 26, 2007

Problem (1)

Consider the system of two linear ODES.

$$\frac{dx_1}{dt} = 8x_1 + 9x_2 - 6$$

$$\frac{dx_2}{dt} = 5x_1 + 6x_2 - 3$$

Determine the location, type and stability of the critical point.

Problem (2)

Consider the system of two nonlinear AES.

$$f_1(x_1, x_2) = 8x_1 + 3x_2^2 - 3$$
$$f_2(x_1, x_2) = 2x_1^2 - 6x_2 - 6$$

Find the approximate value of the root near [0,0].