

Midterm Examination
Administered: Monday, October 24, 2005

Problem (1)

Consider the system of two linear ODES.

$$\frac{dx_1}{dt} = 8x_1 + 9x_2 - 3$$
$$\frac{dx_2}{dt} = 5x_1 + 6x_2 - 6$$

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

Problem (2)

Consider the system of two nonlinear ODES.

$$\frac{dx_1}{dt} = 8x_1 + 3x_2^2 - 3$$
$$\frac{dx_2}{dt} = 2x_1^2 - 6x_2 - 6$$

Determine the approximate location, type and stability of the critical point near [0,0].