ECE 330 HW 9

In class quiz – Fri, Nov 30.
Copies of the textbook are kept at the Grainger Engineering Library Reserve

Textbook problem 5.1

Textbook problem 5.4 (a and b only)

Textbook problem 5.5

Special Problem #1 (see solution Spring 2004 Final)
A dynamic system is modeled as:

$$\dot{x_1} = -3x_1 + 2x_2$$
$$\dot{x_2} = x_1^2 - 2x_2 + 2$$

1. Find all equilibrium points.
2. Linearize the system at each equilibrium point.
3. Determine the eigenvalues at each equilibrium point. Determine which points are stable and which are unstable.

Special Problem #1 (see solution Spring 2003 Final)
A nonlinear dynamic model of a system is:

$$\frac{dx}{dt} + x^2 - 16 = 0$$

1. Find the two equilibrium points x_{e_1} and x_{e_2}.
2. Find the linearized model ($\frac{d\triangle x}{dt}$)valid for either equilibrium point.
3. Is x_{e_1} stable or unstable equilibrium point?
4. Is x_{e_2} stable or unstable equilibrium point?