

## Assignment 4

due: Monday, April 2, in class

**Problem 1:** Solve the following differential equations:

a)  $\dot{x} = t^3 - t$

b)  $e^x \dot{x} = t + 1$

c)  $\dot{x} + ax + bc^t x = 0$

**Problem 2:** Find the general solutions and the particular solutions thru  $(t = 0, x = 1)$ :

a)  $\dot{x} - 3x = 5$

b)  $3\dot{x} + 2x + 16 = 0$

c)  $\dot{x} + 2x = t^2$

**Problem 3:** Determine the nature of the possible equilibrium states for:

a)  $\dot{x} = x^3 + x^2 - x - 1$

b)  $\dot{x} = 3x^2 + 1$

c)  $\dot{x} = xe^x$