Chemistry 5850 Fall 2005 Assignment 11

Due: Wednesday, Dec. 7.

Weight of this assignment: 20 marks

1. Carry out a linearized stability analysis of the DDE

$$\dot{x} = -x + x(t-1)^2.$$

   [10 marks]

2. Solve the DDE by the method of steps for $t \in (0,5)$ for the initial conditions

   (a) $x(t) = 0.5$ for $t \in [-1,0]$,
   (b) $x(t) = 1.5$ for $t \in [-1,0]$, and
   (c) $x(t) = 0$ for $t \in [-1,0)$, $x(0) = 1.5$.

   Note that the last initial condition is discontinuous. Plot your solutions and comment on your results relative to your stability analysis. [10 marks]