

SHEET (5)

1. Solve the following problems using “dsolve” toolbox.

a)  $y' = xy$  ,  $y(1) = 1$  .

b)  $y''(x) + 8y'(x) + 2y(x) = \cos(x)$  ,  $y(0) = 0$  ,  $y'(0) = 1$ .

2. Solve and plot the following problems using MATLAB ODE's, and Simulink toolboxes. (try to use different solvers)

a)  $y' = ty + y$  ;  $y(0) = 1$  ,  $0 \leq t \leq 0.5$

b)  $\frac{dy}{dx} = xy^2 + y$  ;  $y(0) = 1$  ,  $x \in [0, 0.5]$

c)  $y_1' = y_2 y_3$  ,  $y_1(0) = 0$   
 $y_2' = -y_1 y_3$  ,  $y_2(0) = 1$   
 $y_3' = -0.51 y_1 y_2$  ,  $y_3(0) = 1$

d)  $y' = \frac{-ty}{\sqrt{2-y^2}}$  ,  $y(0) = 1$  ,  $t \in [0, 0.5]$

e)  $x'' + (x^2 - 1)x' + x = 0$  ;  $x(0) = 0$  ,  $x'(0) = 0.25$  ,  $t \in [0, 20]$  .

f)  $my'' + y'e^y - y^2 = 5$  ;  $y(0) = 3$  ,  $y'(0) = -1$  ,  $t \in [0, 10]$  .