MATH 260 MATLAB EXERCISE I

Commands (I)

Basic Operations: Addition (+)Subtraction (-) Multiplication (*) Division (/)Exponent (^)

Example: $x^2+\frac{2}{3}x-16\div 7^5\times 2 = x\text{^}2+2/3*x-16/7\text{^}5*2$

Solution of ODE: Command (dsolve)

$y' = Dy$, $y'' = D2y$, $y''' = D3y$, Independent variable x = 'x'

The following 3 examples show how to use MATLAB to solve ODE:

Example 1

Solve the Ist Order ODE: $y'+2y=x$

MATLAB Command: >>dsolve('Dy+2*y=x','x') **Press "Enter key"**

MATLAB Answer: 1/2*x-1/4+exp(-2*x)*C1

What does MATLAB Answer mean: $y=\frac{1}{2}x-\frac{1}{4}+Ce^{-2x}$

Example 2

Solve Ist Order IVP: $y'=ay \qquad y(0)=b$

MATLAB Command: >>dsolve('Dy=a*y','y(0)=b','x') **Press "Enter key"**

MATLAB Answer: exp(a*x)*b

What does MATLAB Answer mean: $y=be^{ax}$

Example 3

Solve the 2nd Order IVP: $y''=-a^2y, \quad y(0)=1, \quad y'\left(\frac{\pi}{a}\right)=0$

MATLAB Command:

>>dsolve('D2y=-a^2*y','y(0)=1','Dy(pi/a)=0','x') **Press "Enter key"**

MATLAB Answer: cos(a*x)

What does MATLAB Answer mean: $y=\cos(ax)$

Now do the same and solve the following ODE:

1. $xy'-y=x$, $y(1)=7$

2. $y'+2y=e^x$