**ABDULMOIZ BIN MEHMOOD COMPUTATIONAL PHYSICS ASSIGNMENT 6 SP14-BPH-032**

%Q2... ///function files are funky2.m and eulery.m

clear all;

close all;

clc

t0=0;

tf=1;

n=4;

y0=-1;

y = eulery(n,t0,tf,y0);

fprintf('So the solution is approxmately: %3.4f correct to 4 decimal places',y(n+1))

**MAIN FTN FILE**

%q2 main euler function file

%function input form f=f(stepno.-n,t0,t-final,y0)

function y=eulery(n,t0,t1,y0)

h=(t1-t0)/n;

t(1)=t0;

y(1)=y0;

for i=1:n

t(i+1)=t(i)+h;

y(i+1)=y(i)+h\*funky2(t(i),y(i));

end;

**EQUATION FTN FILE**

%q2 function

function dy=funky2(t,y)

dy=(2\*t - y);

%Q4... ///function file us funky4.m

clear all;

close all;

clc

ti=0;

tf=20;

ts=[ti tf];

% %initial conditions

ic=[0; 0.25];

% %making a call

[t,x] = ode45(@funky4,ts,ic);

% plotting the solution

plot(t,x(:,1),'r -o',t,x(:,2),'g -o')

title('Solution of van der Pol Equation using ODE45');

xlabel('Time - T');

ylabel('Solution - X');

legend('x1','x2')

**Func File**

function dxdt = funky4(t,x)

dxdt = [x(2); -(x(1)^2 - 1)\*x(2) - x(1)];

%**Q5**... ///function file us funky5.m

clear all;

close all;

clc

xi=0;

xf=1;

xs=[xi xf];

% %initial conditions

ic=[1; -2; -4];

% %making a call

[x,y] = ode45(@funky5,xs,ic);

% plotting the solution

plot(x,y(:,1),'r -o',x,y(:,2),'g -o',x,y(:,3),'b -o')

title('Solution 3RD ORDER DE using ODE45');

xlabel('X');

ylabel('Solution Y');

legend('Y1','Y2','Y3')

set(legend,...

'Position',[0.2 0.2 0.1 0.1]);

**Func File**

function dydt = osc(t,y)

dydt = zeros(3,1); % this creates an empty column

%vector that you can fill with your 3 derivatives:

dydt(1) = y(2);

dydt(2) = y(3);

dydt(3) = 5\*y(3) + 22\*y(2) - 56\*y(1);

end