**TUTORIAL-2 NUMERICAL METHOD**

**Chapter FIVE: Solution of Differential equation**

**Chapter SIX: Solution of Partial Differential equation**

1. Use fourth-order Runge kutta method or RK-4 method or Standard RK method, solve the following differential equation for at and 0.45 given that , y(0)=1.
2. Use second order runge kutta method to solve =0;at and 0.4 given that y=1, z=1 at.
3. Solve the differential equation,, within and using RK 4th  order method.
4. Using runge-kutta method of second order, obtain a solution of the equation, with the initial condition for the range with the increments of 0.2.
5. Solve; subject to the initial condition y(0)=2 for y(0.5) and y(1.0) using Runge-kutta second order method.
6. Solve the following boundary value problem using shooting method.

, with y(1)=1and y(2)=5 and h=0.25.

1. Solve for y(0.2) subject to the condition y(0)=1 using modified Euler’s method.
2. Solve the differential equation within using RK 4rth order method.

, y(0)=0, y’(0)=0. Take h=0.25.

1. Solve the following equation by Picard’s method

, y(0)=0 and estimate y(0.1), y(0.2) and y(1).

1. Given: y(1)=0, solve for y at x=1.04 by using Euler’s method (take h=0.01)
2. Solve the differential equation by RK 4rth method, with initial condition y(0)=3, y’(0)=0 for y(0.2) taking h=0.2.
3. Solve the following boundary value problem using shooting method,, with y(0)=1 and y(1)=1 (take h=0.5).
4. Solve Initial value problem

y(0)=0 by picard’s method. Calculate up to second approximation. [Hint:

1. Given that , y(0)=1. Calculate the second approximation and hence fine the value at x=0.5 using Picard’s method.
2. Employ the Taylor’s series method to obtain the values of y at x=0.1 and 0.2 for the initial value problem

, y(0)=0, take h=0.1.

1. Solve the following boundary value problem by shooting method

, y(0)=2 and y(1)=5.

1. Using Taylor’s series method, solve
2. , at
3. , at
4. Obtain y(1.5) to the following differential equation using RK-4rth order method

, with y(1)=0 and h=0.25.

1. Given the Poisson’s equation: over the square domain such that and with Dirchlet boundary condition of. Calculate the steady state temperatures at interior point by using iteration method. Assume, h=k=1.
2. Solve the following differential equation within using Heun’s method.

with=1 and. Take h=0.5.

1. Given the Poisson’s equation: over the square domain such that and with Dirchlet boundary condition of. Calculate the steady state temperatures at interior point by using iteration method. Assume, h=k=1.[8]
2. Solve the following differential equation within using Heun’s method.[8]

With =1 and. Take h=0.5.

1. Using Taylor’s series method, find the value of y at x=1.1. [7]

, y(1) =2

1. Solve the poison’s equation over a square domain with step size with on the boundary.
2. Consider a sheet metal of size. The two adjacent sides are maintained at temperature of and other tow sides are held at. Calculate the steady state temperature at interior points assuming a grid size 10cm by 10cm.
3. Solve the poison equation , given that
4. Solve the poison’s equation on a square with on the boundary. Take step size.