**Bisection Method**

**Question number 2**

F(x)= 2coshx sinx-1

Xo=0.4 X1=0.5

F(Xo)=2cosh (Xo) sin(Xo) -1= 2cosh(0.4)sin(0.4)-1 = -0.1580= -0.16

F(X1)= 2cosh (X1) sin(X1) -1=2cosh (0.5) sin(0.5) -1= 0.0711

Checking condition here

F(Xo)F(X1)<0

X2=(Xo+X1)/2

X2=0.45

F(X2)= 2coshx2 sinx2-1 = 2cosh 0.45 sin 0.45-1

=2 x 1.1030 x 0.43497 -1 = -0.040460

=-0.040460

F(X2) F(X0)<0 not true

F(X2) F(X1) <0 True

X3= (X2 + X1)/2 = 0.475

F(X3)= 2coshx3 sinx3 – 1

=2 cosh(0.475) sin (0.475) -1 = 0.0198

F(X2) F(X3) <0 true

X4=(X2 + X3)/2 = 0.462

F(X4) =2 cosh(0.462) sin (0.462) -1 = -0.011705

F(X3) F(X4) <0 true

X5= x3+x4/2 = 0.46850

F(X5) =2 cosh(0.46850) sin (0.46850) -1 = 0.0041

**Bisection Method (Binary Search Method)**

X0=4 X1=5

F(x)

F(Xo) \* F(X1) <0 true

X2=(Xo+X1)/2

F(X2) =0

F(X2) \* F(X1) <0 true

X3=(X2+X1)/2

F(X3)=0

F(X2) \* F(X1) <0 false

F(X2) \* F(X0) <0 true

X3=(X2+X0)/2

F(X3)=0

**X0=0.4 X1=0.6 X2=0.5 X3=0.45 X4=0.475 X5=**0.4875

F(x)= sinx-5x+2

Xo=0.4 X1=0.6

F(X0)=sin(0.4)-5(0.4)+2= 0.38941

F(X1)=sin(0.6)-5(0.6)+2= -0.4353

F(X0) \* F(X1) <0 true

X2=Xo+X1/2= 0.4+0.6/2= 0.5

F(X2)= sin (0.5) -5(0.5)+2 = -0.0206

F(X2)\* F(X1) <0

-0.0206 \* -0.4353 < 0 false

X3=(X2+X1)/2

F(X2) \* F(Xo)<0

-0.0206 \* 0.38941 <0 true

X3= (X2+X0)/2

X3= 0.5+0.4/2= 0.45

F(X3)=0.1850

F(X3) \* F(X2) <0 true

X4=X3+X2/2= 0.475

F(X4)=0.0823

F(X4) \* F(X2) <0 true

X5=X4+X2/2 = 0.4875

F(X5)=0.0309

Question No 2:

F(x)=2 coshx sin x -1

**X0=0.4 X1=0.5 x2=0.45 X3=0.475 X4= 0.4625 X5=0.46875**

F(X0) = - 0.15850

F(X1) = 0.0811

F(X0) \* F(X1) <0

X2=(X0+X1)/2 = 0.45

F(X2) =-0.04049

F(X2) \* F(X1) < 0 true

X3=(X2+X1)/2= 0.475

F(X3)=0.0198

F(X3) \* F(X2) <0 true

X4=(X3+X2)/2 = 0.475+ 0.45 /2 = 0.4625

F(X4) = -0.0104

X5=0.46875

F(X5)= -0.00464

Bisection Method (Binary Search Method)

Xo

X1

F(Xo) x F(X1) < 0

F(x) = 2 X

First initial guess

Xo=1

X1=2

F(X0) = 2 Xo = 2

F(X1)= 2 X1 = 4

F(Xo) x F(X1) <0

2 x 4 <0 initial guess is not correct

Xo=1

X1=-1

F(X0) = 2 Xo = 2

F(X1)= 2 X1 = -2

F(Xo) x F(X1) <0

2 x -2 < 0

X2= (Xo + X1) /2

= 1 -1 /2= 0

F(x) = 2x =0

X2= (Xo + X1) /2

F(X2)=0

If not equal to zero

F(X2) x F(X1) <0

If not less than zero

F(X2) x F(X0) <0

X3 = (X2 + Xo) /2

F(X3) = 0

If not equal to zero

F(X3) x F(X2) <0

If not less than zero

F(X3) x F(X0) <0

X4 = (X3 + Xo) /2

F(x) = sinx – 5x + 2

X0=0.4 X1 = 0.6

F(Xo) = sin (Xo) – 5 (Xo) + 2 = 0.3894

F(X1) = sin (X1) – 5 (X1) + 2 = - 0.4354