ESO208a

Programming Assignment
Report

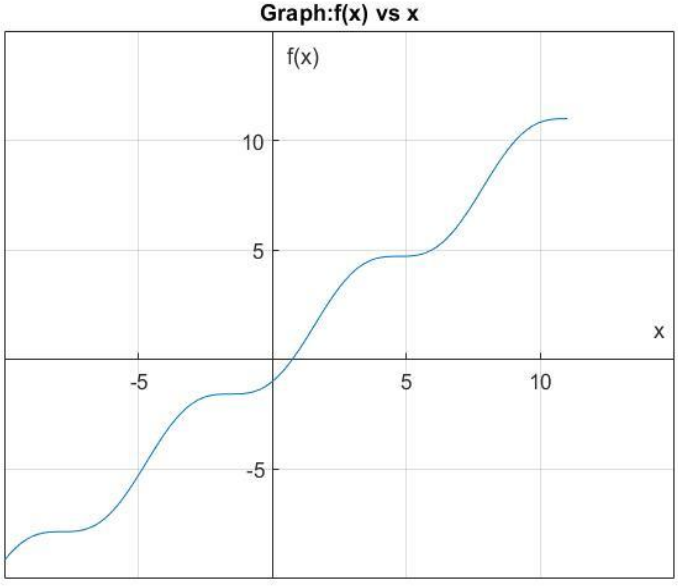
Name:-Ramveer
Roll no:-180591
Section:-O5

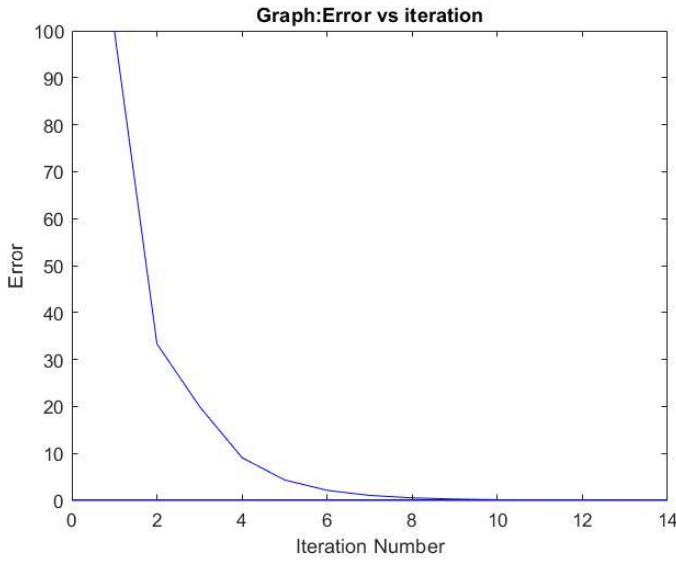
f(x)=x-cos(x)

1:Bisection Method

```
Command Window
New to MATLAB? See resources for Getting Started.
>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
1
Enter function as function of x:: x-cos(x)
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.01
Enter covergence criteria for the function value:: 0.0000
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.739075>>
```

Root of f(x) is : 0.739075





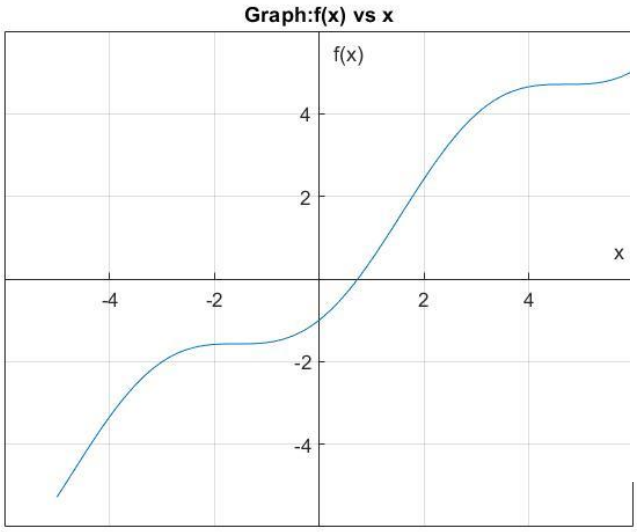
f(x)=x-cos(x)

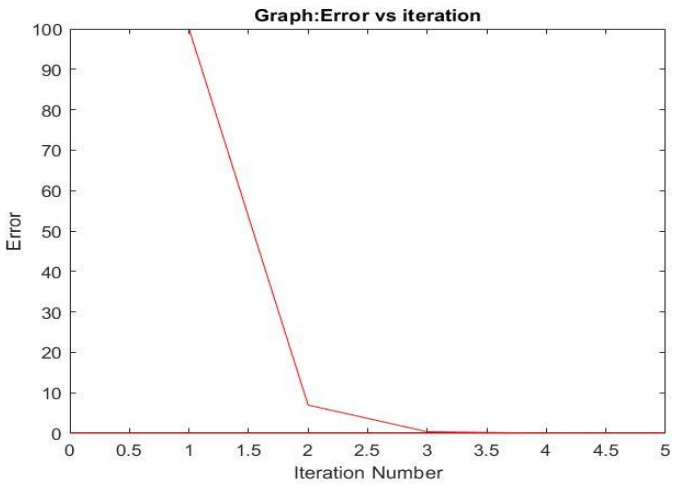
2:False-position Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
2
Enter function as function of x:: x-cos(x)
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.01
Enter covergence criteria for the function value:: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.739085>>
```

Root of f(x) is : 0.739085





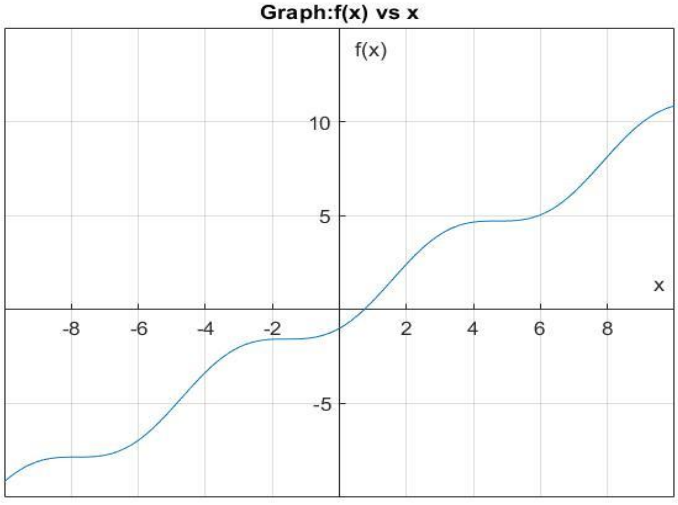
f(x)=x-cos(x)

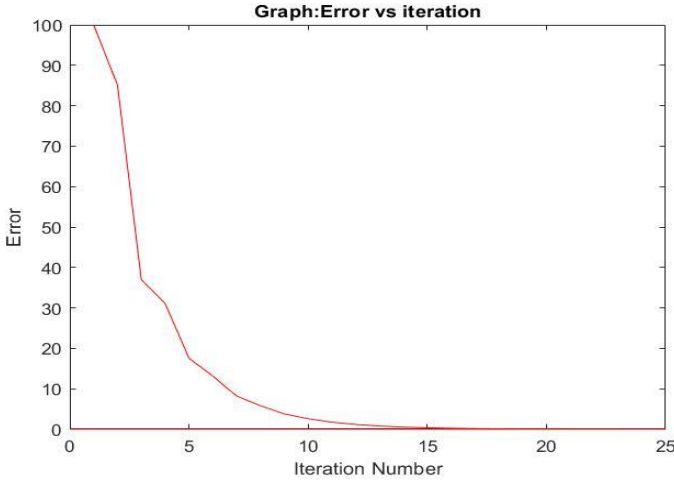
3:Fixed-point Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
3
Enter g(x) such that x=g(x):: cos(x)
Enter the starting point:: 0
Enter convergence criterion for relative approximate errrors(%):: 0.01
Enter covergence criteria for the function value(%):: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error
Root of f(x) is : 0.739106>>
```

Root of f(x) is : 0.739106





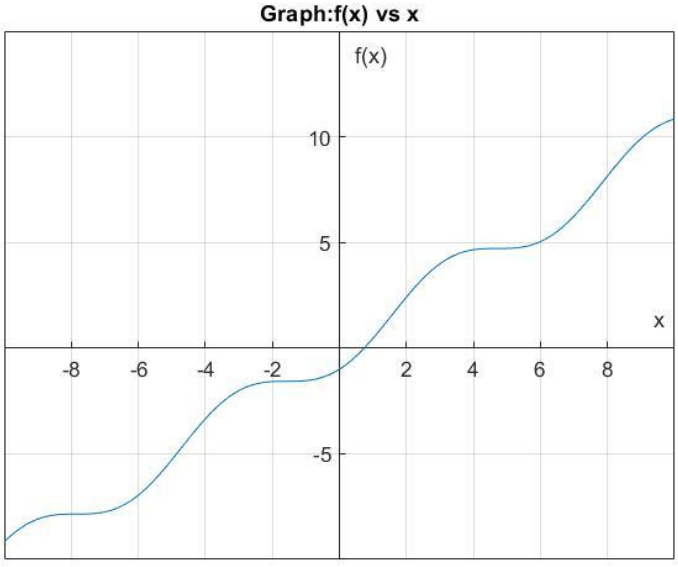
f(x)=x-cos(x)

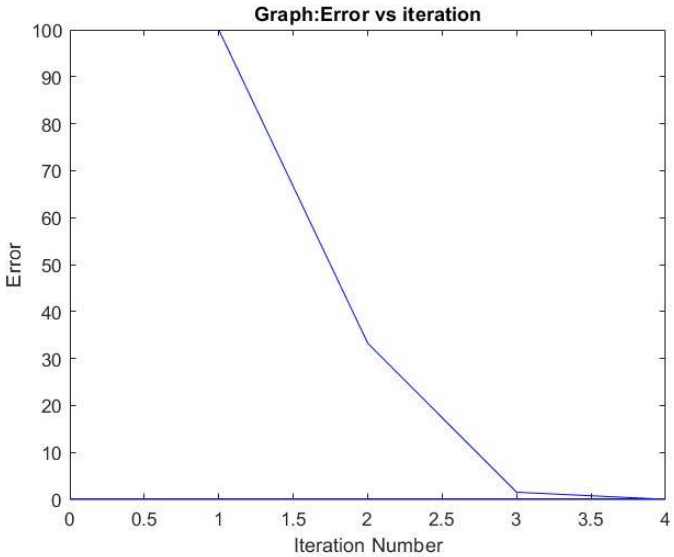
4:Newton Raphson Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
4
Enter function f(x):: x-cos(x)
Enter function f prime:: 1+sin(x)
Enter the starting point:: 0
Enter convergence criterion for relative approximate errrors(%):: 0.01
Enter covergence criteria for the function value(%):: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error
Root is : 0.739085>>
```

Root of f(x) is : 0.739085





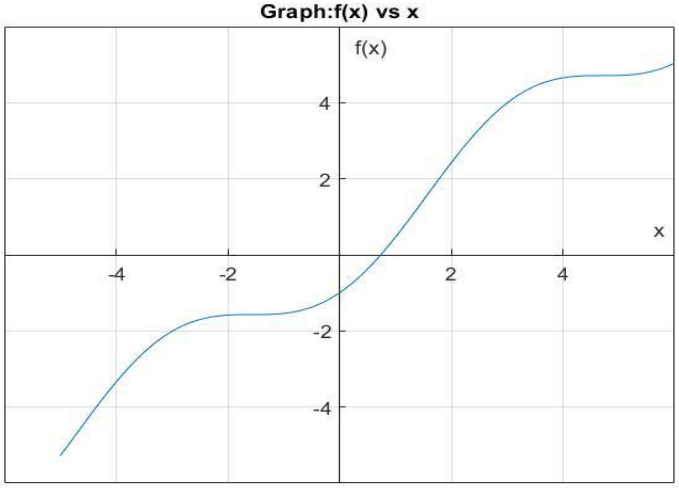
f(x)=x-cos(x)

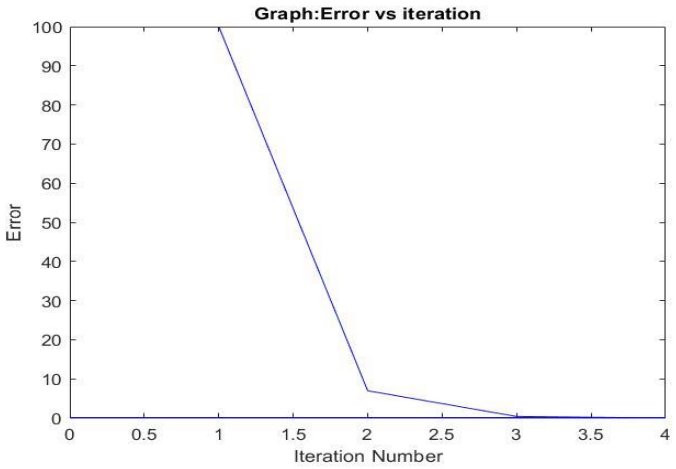
5:Secant Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
5
Enter function as function of x:: x-cos(x)
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.01
Enter covergence criteria for the function value:: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.739085>>
```

Root of f(x) is : 0.739085





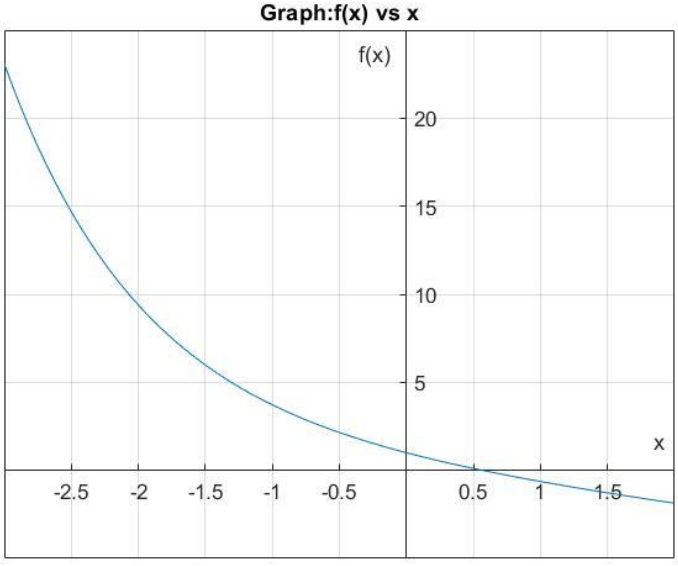
f(x)=exp(-x)-x

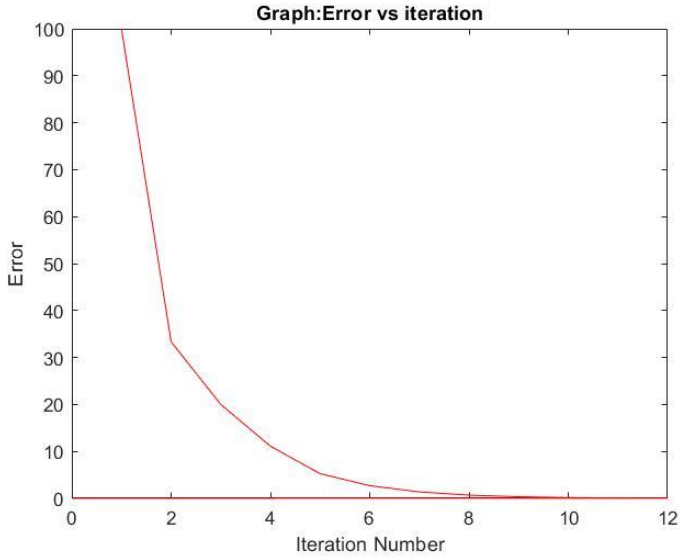
1:Bisection Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
1
Enter function as function of x:: exp(-x)-x
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.05
Enter covergence criteria for the function value:: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.567139>>
```

Root of f(x) is : 0.567139





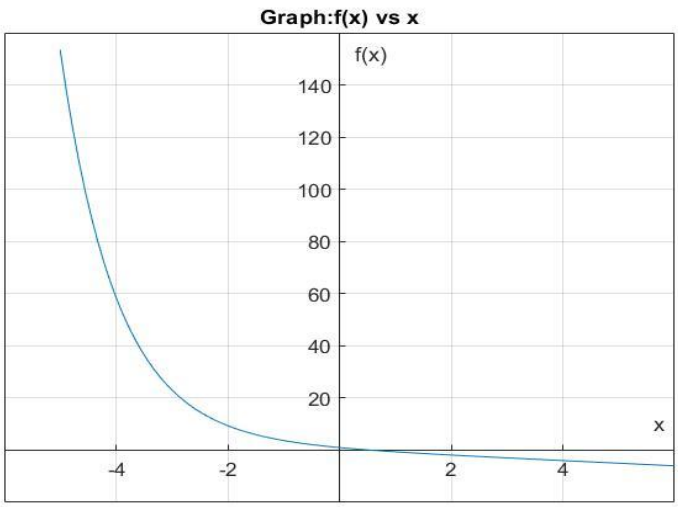
f(x)=exp(-x)-x

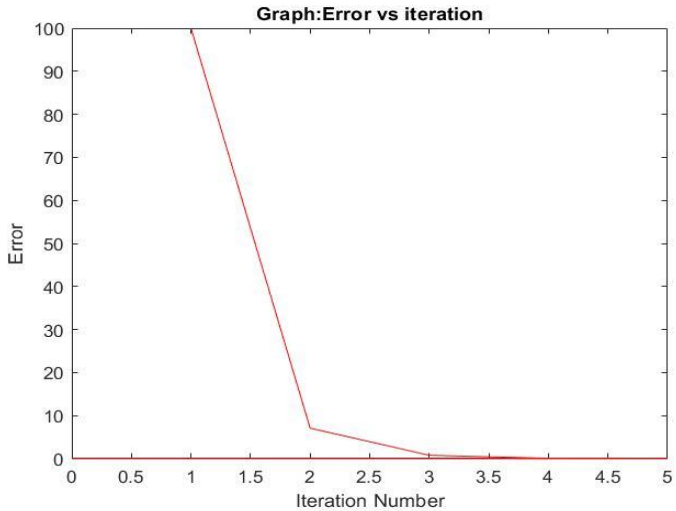
2:False-position Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
2
Enter function as function of x:: exp(-x)-x
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.05
Enter covergence criteria for the function value:: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.567150>>
```

Root of f(x) is : 0.567150





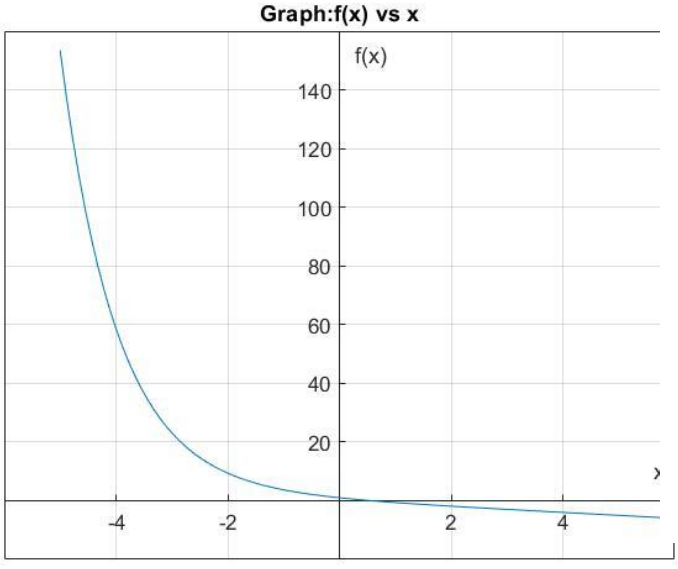
f(x)=exp(-x)-x

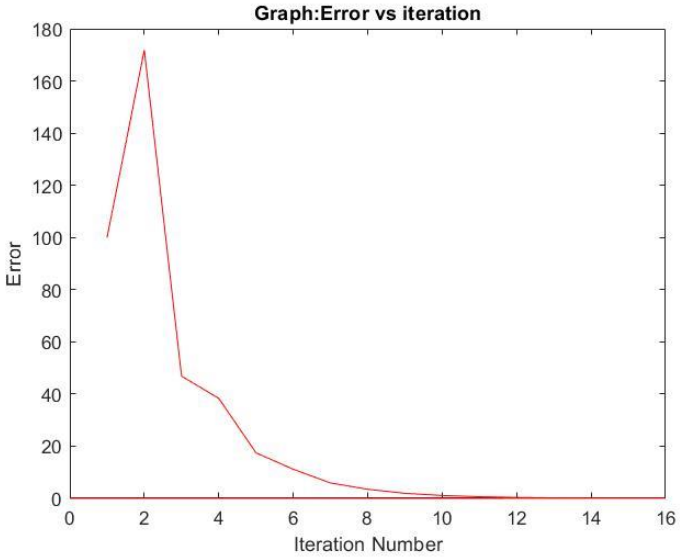
3:Fixed-point method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
3
Enter g(x) such that x=g(x):: exp(-x)
Enter the starting point:: 0
Enter convergence criterion for relative approximate errrors(%):: 0.05
Enter covergence criteria for the function value(%):: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error
Root of f(x) is : 0.567068>>
```

Root of f(x) is : 0.567068





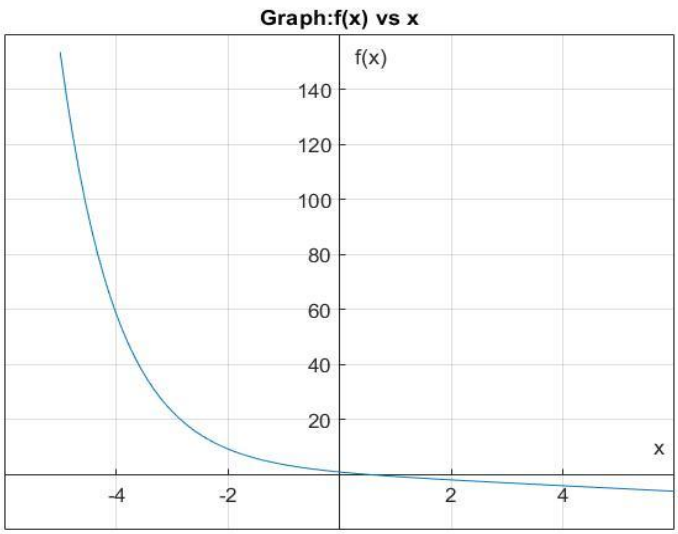
f(x)=exp(-x)-x

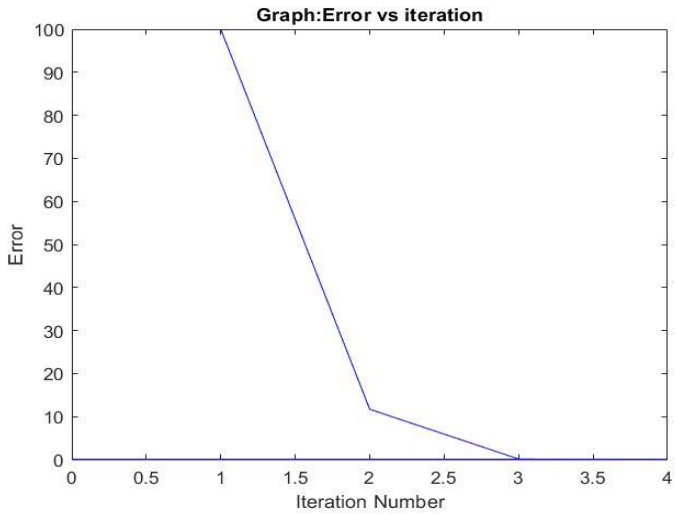
4:Newton-Ralphson method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
4
Enter function f(x):: exp(-x)-x
Enter function f prime:: -exp(-x)-1
Enter the starting point:: 0
Enter convergence criterion for relative approximate errrors(%):: 0.05
Enter covergence criteria for the function value(%):: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error
Root is : 0.567143>>
```

Root of f(x) is : 0.567143



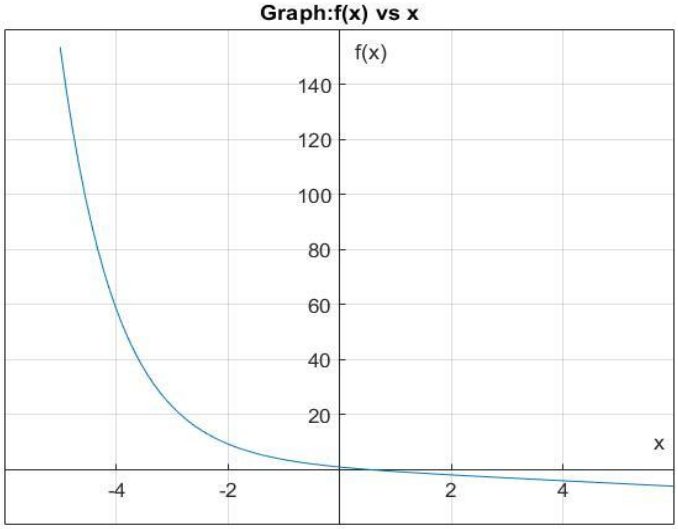


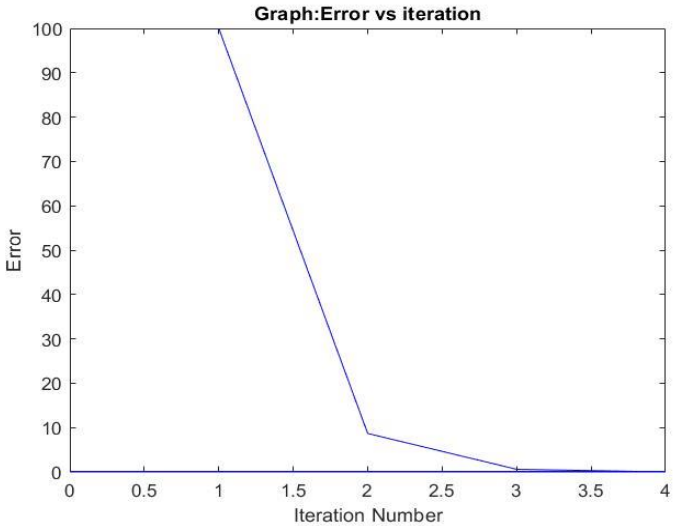
f(x)=exp(-x)-x

5:secant method

```
Command Window
New to MATLAB? See resources for Getting Started.
>> Assign180591
If the Equation is polynomial then type Y otherwise N N
Type 1 for Bisection method
Type 2 for False-position method
Type 3 for Fixed-point method
Type 4 for Newton-raphson
Type 5 for Secant method
5
Enter function as function of x:: exp(-x)-x
Enter the first starting point:: 0
Enter the second starting point:: 1
Enter convergence criterion for relative approximate errrors:: 0.05
Enter covergence criteria for the function value:: 0.00
Enter maximum iteration number:: 50
Convergence criterion for relative approximate error achieved
Root of f(x) is : 0.567143>>
```

Root of f(x) is : 0.567143





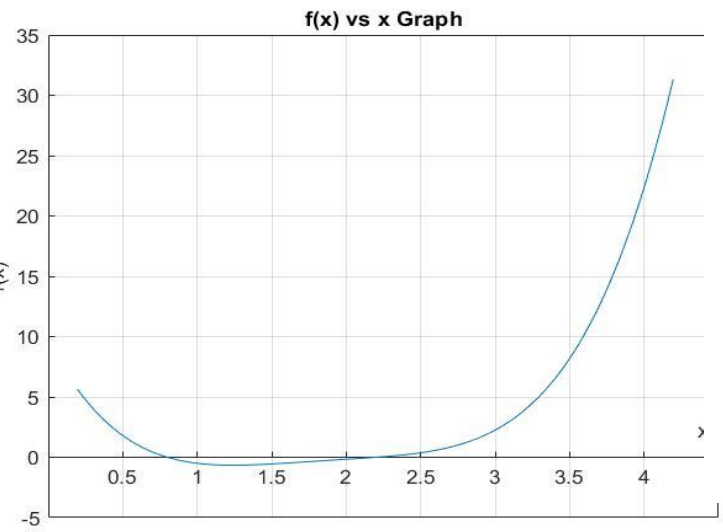
$$f(x) = x^4 - 7.4x^3 + 20.44x^2 - 24.184x + 9.6448 = 0$$

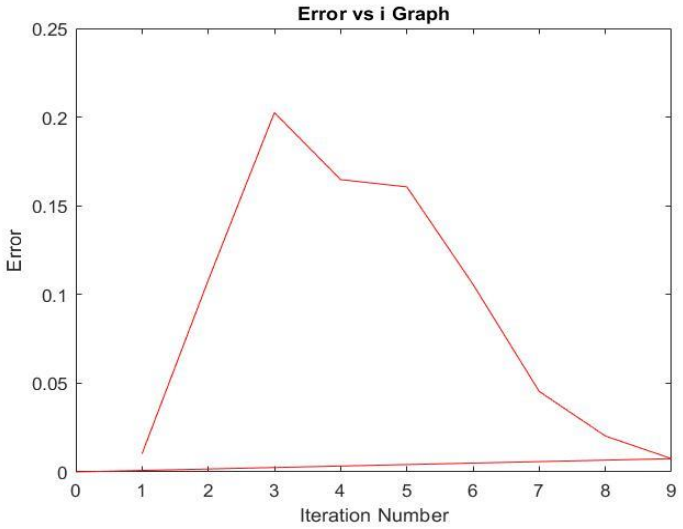
1:Muller Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N Y
What is the order of the equation?: 4
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   9.6448
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   -24.184
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   20.44
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   -7.4
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   1
Type 1 for Muller method
Type 2 for Bairstow method
1
Enter x0:: -1
Enter x1:: 0
Enter x2:: 1
Enter convergence criterion for relative approximate error:: 0.01
Enter convergence criterion for function value:: 0.00
Enter the number of Maximum iterations:: 50
Convergence criterion for relative approximate error acheived
Root of polynomial is: 2.195584>>
```

Root of f(x) is : 2.195584





$$f(x) = x^4 - 7.4x^3 + 20.44x^2 - 24.184x + 9.6448 = 0$$

1:Bairstow Method

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Assign180591
If the Equation is polynomial then type Y otherwise N Y
What is the order of the equation?: 4
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   9.6448
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   -24.184
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   20.44
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   -7.4
Enter vector for polynomial in order of a0,a1,a2...in a0+a1*x+a2*x^2.....::   1
Type 1 for Muller method
Type 2 for Bairstow method
2
Enter value of r::  2
Enter value of s::  -2
Convergence criterion for relative approximate error::  0.01
Convergence criterion for function value::  0.00
Maximum iteration number:: 50
fx Roots of the polynomial are : 2.200000 0.800000  2.200000 2.200000 >>
```

Root of f(x) are : 2.20000,0.80000,2.200000,2.200000