

Q1 part (a)

Bisection Method

Enter the non-linear equation in x: $x - \cos(x)$

Enter the number corresponding to the method you wish to use.

1. Bisection
2. False-position
3. Fixed Point Iteration
4. Newton-Raphson
5. Secant

choice: 1

Enter the maximum approximate error in percentage: 0.01

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

e_a =

33.3333

e_a =

20

e_a =

9.0909

e_a =

4.3478

e_a =

2.1277

e_a =

1.0526

e_a =

0.5291

e_a =

0.2639

e_a =

0.1321

e_a =

0.0661

e_a =

0.0330

e_a =

0.0165

e_a =

0.0083

Root= 0.739075

False-position

Enter the non-linear equation in x: $x - \cos(x)$

Enter the number corresponding to the method you wish to use.

1. Bisection
2. False-position
3. Fixed Point Iteration
4. Newton-Raphson
5. Secant

choice: 2

Enter the maximum approximate error in percentage: 0.01

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

$e_a =$

6.9572

$e_a =$

0.3581

$e_a =$

0.0180

$e_a =$

8.9997e-04

Root= 0.739085

Fixed point iteration

Enter the non-linear equation in x: x

Enter the number corresponding to the method you wish to use.

- 1.Bisection
- 2.False-position
- 3.Fixed Point Iteration
- 4.Newton-Raphson
- 5.Secant

choice: 3

Enter the maximum approximate error in percentage: 0.01

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter the second non-linear equation in x: $\cos(x)$

e_a =

100

e_a =

85.0816

e_a =

36.9949

e_a =

31.0663

e_a =

17.5418

e_a =

13.1331

e_a =

8.1930

$e_a =$

5.7966

$e_a =$

3.7733

$e_a =$

2.5996

$e_a =$

1.7244

$e_a =$

1.1735

$e_a =$

0.7850

$e_a =$

0.5313

$e_a =$

0.3567

$e_a =$

0.2408

$e_a =$

0.1620

$e_a =$

0.1092

$e_a =$

0.0735

$e_a =$

0.0495

$e_a =$

0.0334

$e_a =$

0.0225

$e_a =$

0.0151

$e_a =$

0.0102

e_a =

0.0069

Root= 0.739106

Newton Raphson:

Enter the non-linear equation in x: $x - \cos(x)$

Enter the number corresponding to the method you wish to use.

1. Bisection
2. False-position
3. Fixed Point Iteration
4. Newton-Raphson
5. Secant

choice: 4

Enter the maximum approximate error in percentage: 0.01

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter the derivative of non-linear equation in x: $1 + \sin(x)$

e_a =

100

e_a =

33.2687

e_a =

1.5222

e_a =

0.0038

Root= 0.739085

Secant

Enter the non-linear equation in x: $x - \cos(x)$

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 5

Enter the maximum approximate error in percentage: 0.01

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

$e_a =$

6.9572

$e_a =$

0.3816

$e_a =$

0.0046

Root= 0.739085

Q1 part (b)

>> Bisection

Enter the non-linear equation in x: $\exp(-x)-x$

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 1

Enter the maximum approximate error in percentage: 0.05

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

e_a =

33.3333

e_a =

20

e_a =

11.1111

e_a =

5.2632

e_a =

2.7027

e_a =

1.3699

e_a =

0.6897

e_a =

0.3436

e_a =

0.1721

e_a =

0.0861

e_a =

0.0430

Root= 0.567139

>> False Position

Enter the non-linear equation in x: $\exp(-x)-x$

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 2

Enter the maximum approximate error in percentage: 0.05

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

100

e_a =

1.9576e-14

Root= 0.567143

>> Fixed Point Iteration

Enter the non-linear equation in x: x

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 3

Enter the maximum approximate error in percentage: 0.05

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter the second non-linear equation in x: $\exp(-x)$

e_a =

100

e_a =

171.8282

e_a =

46.8536

e_a =

38.3091

e_a =

17.4468

e_a =

11.1566

e_a =

5.9034

e_a =

3.4809

$e_a =$

1.9308

$e_a =$

1.1089

$e_a =$

0.6244

$e_a =$

0.3556

$e_a =$

0.2012

$e_a =$

0.1143

$e_a =$

0.0648

$e_a =$

0.0367

Root= 0.567068

>>

>> Newton-Raphson

Enter the non-linear equation in x: $\exp(-x)-x$

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 4

Enter the maximum approximate error in percentage: 0.05

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter the derivative of non-linear equation in x: $-\exp(-x)-1$

e_a =

100

e_a =

11.7093

e_a =

0.1467

e_a =

2.2106e-05

Root= 0.567143

>> Secant

Enter the non-linear equation in x: $\exp(-x)-x$

Enter the number corresponding to the method you wish to use.

1.Bisection

2.False-position

3.Fixed Point Iteration

4.Newton-Raphson

5.Secant

choice: 5

Enter the maximum approximate error in percentage: 0.05

Enter the maximum number of iteration you want: 50

Enter first guess value: 0

Enter second guess value: 1

e_a =

8.6659

e_a =

0.5875

e_a =

0.0048

Root= 0.567143

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