Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_1

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = x^2 + e^x - 3$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_2

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = e^x + sin(x) - 0.5$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_3

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = 1/x + e^x - 5$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_4

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = log(x) + 1/x^2 - 2$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_5

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = log(x) + sin(x)$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_6

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = log(x) + cos(x) - 1$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_7

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = log(x) - 1/x + 2$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_8

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = 1/x^2 - x/10$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_9

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = x^3 - log(x) - 2$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_10

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = x^3 - sin(x) - 2$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_11

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = x^4 - sin(x) - 1$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_12

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = 1/x - sin(x)$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!

Numerical mathematics 2021
group: MA19w1-B
Report 1: Root finding - No. NM_13

name:.....

points:..... examiner: .....

General notes:

- Always work with compact Matlab statements!
- Document your results for each task individually in a runnable Matlab script file with explanatory comments and a results document.
- The script files and the result document are to be sent electronically to **florian.zaussinger@hs-mittweida.de** by **April 20, 2021 at 11:00am** at the latest.
- Scoring: 32 total points

Let be given a real function $f(x) = 1/x - cos(x)$.

1. Task 1 (2P): Visualize the function with Matlab. Add a title, labels and a grid.
2. Task 2 (2P): Locate the root(s) of the function and label them in the figure. In case of multiple roots choose at maximum 3 roots. Choose an appropriate precision for the location of the roots (e.g. $\epsilon = 10^{-4}$).
3. Task 3 (5P): Write a Matlab script finding one root based on the *bisection method*.
4. Task 4 (5P): Write a Matlab script finding one root based on the *false position method*.
5. Task 5 (7P): Write a Matlab script finding one root based on the *secant method*.
6. Task 6 (7P): Write a Matlab script finding one root based on the *Newton-Raphson method*.
7. Task 7 (2P): Compare all four methods with respect of convergence.
8. Task 8 (2P): Compare your results with the built in function *fzero*.

Good luck!