Numerical Methods, project B, Number 32

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Chapter 1

Find all zeros of function

1.1 a) False position method

1.1.1 Problem

We have to find zeros of the function

$$f(x) = -2.1 + 0.3x - xe^{-x}$$

In the interval $[-5; 10]$
using false position method

1.1.2 Theoretical Introduction

1.1.3 Solution

1.1.4 Results

1.2 b) the Newton's method

1.2.1 Problem

We have to find zeros of the function

$$f(x) = -2.1 + 0.3x - xe^{-x}$$

In the interval $[-5; 10]$
using the Newton's method

1.2.2 Theoretical Introduction

1.2.3 Solution

1.2.4 Results

Chapter 2

Find real and complex roots of the polynomial

2.1 Problem

We have to Find all real and complex roots of the polynomial

$$f(x) = a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$$

where:

$$[a_4\ a_3\ a_2\ a_1\ a_0] = [-2\ 12\ 4\ 1\ 3]$$

So our polynomial looks like this:

$$f(x) = -2x^4 + 12x^3 + 4x^2 + 1x + 3$$

Using the Müller's method. We have to implement both MM1 and MM2 versions. We also need to find real roots using the Newton's method and compare these results with what we got from MM2 version of the Müller's method.

2.2 Theoretical Introduction

2.3 Solution

2.4 Results

2.4.1 Comparison of results between MM1 and MM2

2.4.2 Comparison of results between Newton's method and MM2

Chapter 3

Find real and complex roots of the polynomial using Laguerre's method

3.1 Problem

We have to find all (real and complex) roots of the polynomial from previous exercise:

$$f(x) = -2x^4 + 12x^3 + 4x^2 + 1x + 3$$

Using the Laguerre's method. Then we should compare those results with the MM2 version of the Müller's method.

3.2 Theoretical Introduction

3.3 Solution

3.4 Results

3.4.1 Comparison of results between MM1 and MM2

Chapter 4

Code appendix

Bibliography

[1] Piotr Tatjewski (2014) *Numerical Methods*, Oficyna Wydawnicza Politechniki Warszawskiej