

METODE NUMERIK

BRACKET METHOD ROOT FINDER (BISECTION, REGULA-FALSI, BRENT)



KELOMPOK :

Betranz Leenando – 2201020079

M. Aditya Egi Dwinata – 2201020141

Safitri Wulandari – 2201020085

Seffi Rozahana – 2201020080

Sapar Hidayat. S – 2201020003

TEKNIK INFORMATIKA

FAKULTAS TEKNIK DAN TEKNOLOGI KEMARITIMAN

UNIVERSITAS MARITIM RAJA ALI HAJI

2024-2025

1. Struktur Folder Project



```
1  BRF/  
2      app.py  
3      templates/  
4          index.html  
5      static/  
6          js/  
7              main.js  
8          css/  
9              style1.css  
10
```

A terminal window with a dark background and three colored window control buttons (red, yellow, green) at the top left. The terminal displays a directory listing for a project named 'BRF'. The listing shows a root directory 'BRF/' containing a file 'app.py', a subdirectory 'templates/' with a file 'index.html', and a subdirectory 'static/' which contains subdirectories 'js/' (with file 'main.js') and 'css/' (with file 'style1.css'). Line numbers 1 through 10 are visible on the left side of the terminal output.

2. Tampilan Aplikasi Web :

a. Bisection Method

BRACKET METHOD ROOT FINDER

Function:

Interval XL :

Interval XU :

Tolerance:

Max Iterations:

Method:

Bisection Method

CALCULATE

Iteration 1

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.0 + 2.0}{2} = 1.000000$

Update: $f(x_l) \times f(x_r) = -0.500000 \times 0.341471$

Iteration 2

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.0 + 1.0}{2} = 0.500000$

Update: $f(x_l) \times f(x_r) = -0.500000 \times -0.020574$

Iteration 3

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.5 + 1.0}{2} = 0.750000$

Update: $f(x_l) \times f(x_r) = -0.020574 \times 0.181639$

Iteration 4

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.5 + 0.75}{2} = 0.625000$

Update: $f(x_l) \times f(x_r) = -0.020574 \times 0.085097$

Iteration 5

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.5 + 0.625}{2} = 0.562500$

Update: $f(x_l) \times f(x_r) = -0.020574 \times 0.033303$

Iteration 6

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.5 + 0.5625}{2} = 0.531250$

Update: $f(x_l) \times f(x_r) = -0.020574 \times 0.006611$

Iteration 7

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.5 + 0.53125}{2} = 0.515625$

Update: $f(x_l) \times f(x_r) = -0.020574 \times -0.006921$

Iteration 8

Formula: $x_r = \frac{x_l + x_u}{2} = \frac{0.515625 + 0.53125}{2} = 0.523438$

Update: $f(x_l) \times f(x_r) = -0.006921 \times -0.000140$

Iteration 9

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.53125}{2} = 0.527344$

Update: $f(x_l) \times f(x_r) = -0.000140 \times 0.003240$

Iteration 10

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.52734375}{2} = 0.525391$

Update: $f(x_l) \times f(x_r) = -0.000140 \times 0.001551$

Iteration 11

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.525390625}{2} = 0.524414$

Update: $f(x_l) \times f(x_r) = -0.000140 \times 0.000706$

Iteration 12

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.5244140625}{2} = 0.523926$

Update: $f(x_l) \times f(x_r) = -0.000140 \times 0.000283$

Iteration 13

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.52392678125}{2} = 0.523682$

Update: $f(x_l) \times f(x_r) = -0.000140 \times 0.000072$

Iteration 14

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5234375+0.523681640625}{2} = 0.523560$

Update: $f(x_l) \times f(x_r) = -0.000140 \times -0.000034$

Iteration 15

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5235695703125+0.523681640625}{2} = 0.523621$

Update: $f(x_l) \times f(x_r) = -0.000034 \times 0.000019$

Iteration 16

Formula: $x_r = \frac{x_l+x_u}{2} = \frac{0.5235695703125+0.52362060546875}{2} = 0.523590$

Update: $f(x_l) \times f(x_r) = -0.000034 \times -0.000008$

Hasil Iterasi

ITERATION	XL	XU	XR	F(XL)	F(XU)	F(XR)	F(XL) * F(XR)
1	0.000000	2.000000	1.000000	-0.500000	0.409297	0.341471	-0.170735
2	0.000000	1.000000	0.500000	-0.500000	0.341471	-0.020574	0.010287
3	0.500000	1.000000	0.750000	-0.020574	0.341471	0.181639	-0.003737
4	0.500000	0.750000	0.625000	-0.020574	0.181639	0.085097	-0.001751
5	0.500000	0.625000	0.562500	-0.020574	0.085097	0.033303	-0.000685
6	0.500000	0.562500	0.531250	-0.020574	0.033303	0.006611	-0.000136
7	0.500000	0.531250	0.515625	-0.020574	0.006611	-0.006921	0.000142
8	0.515625	0.531250	0.523438	-0.006921	0.006611	-0.000140	0.000001
9	0.523438	0.531250	0.527344	-0.000140	0.006611	0.003240	-0.000000
10	0.523438	0.527344	0.525391	-0.000140	0.003240	0.001551	-0.000000
11	0.523438	0.525391	0.524414	-0.000140	0.001551	0.000706	-0.000000
12	0.523438	0.524414	0.523926	-0.000140	0.000706	0.000283	-0.000000
13	0.523438	0.523926	0.523682	-0.000140	0.000283	0.000072	-0.000000
14	0.523438	0.523682	0.523560	-0.000140	0.000072	-0.000034	0.000000
15	0.523560	0.523682	0.523621	-0.000034	0.000072	0.000019	-0.000000
16	0.523560	0.523621	0.523590	-0.000034	0.000019	-0.000008	0.000000

Group : Numerical Methods	
NAMA	NIM
Betranz Leenando	2201020079
M. Aditya Egi Dwinata	2201020141
Safitri Wulandari	2201020085
Seffi Rozahana	2201020080
SAPAR HIDAYAT. S	2201020003

b. Regula-Falsi Method

Iteration 1

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 1.099750$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.391094$

Iteration 2

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 0.617079$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.078655$

Iteration 3

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 0.533201$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.008292$

Iteration 4

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 0.524502$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.000782$

Iteration 5

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 0.523683$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.000073$

Iteration 6

Formula: $x_r = xu - \frac{f(xu)(xu-xl)}{f(xu)-f(xl)} = 0.523607$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.000007$

Hasil Iterasi							
ITERATION	XL	XU	XR	F(XL)	F(XU)	F(XR)	F(XL) * F(XR)
1	0.000000	2.000000	1.099750	-0.500000	0.409297	0.391094	-0.195547
2	0.000000	1.099750	0.617079	-0.500000	0.391094	0.078655	-0.039328
3	0.000000	0.617079	0.533201	-0.500000	0.078655	0.008292	-0.004146
4	0.000000	0.533201	0.524502	-0.500000	0.008292	0.000782	-0.000391
5	0.000000	0.524502	0.523683	-0.500000	0.000782	0.000073	-0.000036
6	0.000000	0.523683	0.523607	-0.500000	0.000073	0.000007	-0.000003

c. Brent’s Method

Iteration 1

Formula: $x_r = \text{brentq}(f(x), 0.0, 2.0) = 0.523599$

Update: $f(xl) \times f(x_r) = -0.500000 \times 0.000000$

Hasil Iterasi

ITERATION	XL	XU	XR	F(XL)	F(XU)	F(XR)	F(XL) * F(XR)
1	0.000000	2.000000	0.523599	-0.500000	0.409297	0.000000	-0.000000