Numerical Analysis

Practical Work

By

YOUR NAME 17BS (MS) ABC

Practical

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Presented to

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PRACTICAL NO 1

Title: Solving Non-Linear equation using *BISECTION METHOD*

Description: To solve non-linear equation $f(x) = 0$ on given interval $[a, b]$, such that $f(a).f(b) < 0$, the Bisection method formula is given as

$$c_1 = \frac{a+b}{2}$$

Methodology:

We consider equation $f(x) = x^3 - 11.4x^2 + 31.8x - 4.4$ and starting interval $[a, b]$ is taken, where $a = 3.6$ and $b = 4.6$. Note that the exact root is 4.4000.

Value of function at given initial points (end points of starting interval) is

$$f(a) = 8.42$$
$$f(b) = -3.21$$

Which is

$$f(a).f(b) < 0.$$

We have found iteration using the different tolerances 10^{-2},10^{-4}, and 10^{-6}

- To reach tolerance 10^{-2}, Bisection method takes 7 iterations.
- In 10^{-4} have 14 iterations.
- In 10^{-6} have 21 iterations.

Iterations	**1**	**2**	**3**	**4**	**5**
Approximations	4.1500	4.4250	4.2875	4.3563	4.3906