### Example: Bisection Method for Finding Roots

Let's find the root of a function f(x)f(x)f(x) using the bisection method:

#### Example Function

Let's consider the function: f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5

We'll find the root of this function within the interval [1,3][1, 3][1,3] using the bisection method.

Great! It looks like the bisection method successfully found an approximate root for the equation f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5 within the interval [1,3][1, 3][1,3].

Here’s the interpretation of the results:

**Approximate Root**: The bisection method approximated the root to be x≈2.094552x \approx 2.094552x≈2.094552 within the interval [1,3][1, 3][1,3].

**Value of** fff **at the Root**: Checking fff at the approximate root x≈2.094552x \approx 2.094552x≈2.094552 gives f(2.094552)≈6.23431×10−6f(2.094552) \approx 6.23431 \times 10^{-6}f(2.094552)≈6.23431×10−6, which is very close to zero.

### Interpretation

**Root Accuracy**: The bisection method provides a reasonably accurate approximation of the root xxx for the equation f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5 within the specified interval.

**Function Evaluation**: f(2.094552)f(2.094552)f(2.094552) is close to zero, confirming that x≈2.094552x \approx 2.094552x≈2.094552 is indeed a root of the equation f(x)f(x)f(x).

### Conclusion

The bisection method effectively found the root of the equation f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5 within the interval [1,3][1, 3][1,3], demonstrating its simplicity and reliability in finding roots of continuous functions. This numerical method is straightforward to implement and provides a good starting point for solving various equations in computational mathematics and engineering applications.

3.5