
Assignment 14

Brute-force ‘auto-detection’ of roots via bisectioning Module

Q1

Write a code that can automatically obtain all roots of a continuous function $f(x)$ in any given interval $[a, b]$ by making use of the DIY bisectioning Module for root-finding that you have developed in previous exercise. Test it out for the following case:

$$f(x) = 10 + x^3 - \sin x \sinh x$$

$$[a, b] = [2, 10].$$

Q2

Obtain all roots of a continuous function $f(x)$ for the interval $[a, b]$ by making use of the DIY bisectioning Module for root-finding in Q1. Note that for the case of *i.*, *ii.*, below, you have to manually determine x_0, x_N first.

- i.* $f(x) = x - \text{Tanh } x$, for all x .
- ii.* $f(x) = x^3 + 2x^2 - 3x - 1$, for all x
- iii.* $f(x) = (1/x) \sin x$, for $-3\pi \leq x \leq 3\pi$.
- iv.* $f(x) = \tan(\pi x) - x - 6$, for $-3\pi \leq x \leq 3\pi$.