Home Work (2) - Tools For numerical analysis

Teddy Lazebnik

1.4.2020

1 Submission

You must submit your Homework until the 15.4.2020, 23:59 pm [Israel time]. Include your full name and ID number (in the email title and body). A work without full name and ID number won't be excepted. You must submit your home work with all the questions answered. The submission is done by email. Please submit your work as a single PDF file (with the texts, graphs, and calculation plots) and all the code files. In case of reserve or illness, please send me an email in advance.

2 Home Work

- (1) Implement in Matlab the Bisection, Regula Falsi, Secant, and Newton Raphson algorithms. Show an running example (with print in each iteration) for the following function: $f(x) = x^3 + 50sin(x)$.
- (2) Solve $f(x) = x^3, f(x) = 0$ using the Newton Raphson algorithm where $x_0 = 10.1$. What happens?
- (3) Solve $f(x) = ln(x) + sin(x) - x, f(x) = 0$ using the Bisection algorithm where $a = -5, b = 5$. What happens? What we can change to get better results?
- (4) Find an function $f(x)$ such what it takes 2 (or more) times more iteration to converge using the Regula Falsi algorithm then the Secant algorithm. The stop condition is: $|f(x_i)| < 0.001$.
- (5) Assuming we allow $\epsilon = 0.001$ and our first guess is $[a, b] = [-1, 4]$; How many iteration needed to converge for the Bisection algorithm?