

Computational Physics
I semester – 2020-21
Lab Test-1 Answer sheet

Name: Ameya Ajay Thete

ID Number : 2018B5A70885G

How did you test your code. Describe the test problem, the exact result, and result using Secant method

To test my code, I passed the function $f(x) = x^2 - 7x + 10$ with roots $\{2, 5\}$. For the first root, I used initial guesses of $[-4, 3]$, I obtained the answer 2.000, which is indeed correct. Next, I ran the code using the initial guesses $[4, 10]$, and obtained the answer 5.000 which is also correct.

I also tested the code for the function $f(x) = \exp(x)^2 - 7\exp(x) + 10$ (As the target function contains an exponential). The roots for this function are $\{0.6931, 1.6094\}$. For the first root, I used the guesses $[0, 1]$ and obtained 0.6931; for the second root I used the guesses $[2, 5]$ and obtained 1.6094. Both answers thus obtained are correct, and thus I verified that the code does not malfunction or produce erroneous results.

Function whose zeros are t_{fall} :
$$h_0 - \frac{mg}{b}t + \frac{m^2g}{b^2}(1 - e^{-\frac{bt}{m}}) = 0$$

Write your results here

Time of fall at difference cities should differ by atleast 2 significant figures.

| City | Time of fall (in seconds) | Two initial guesses x_0 & x_1 | Error value at termination $ x_{n+1} - x_n $ |
|--------------|---------------------------|-----------------------------------|---|
| Helsinki | 1.4274 | 1, 7 | 0.000017 |
| Toronto | 1.4287 | 0, 5 | 0.000012 |
| Kuala-Lampur | 1.4310 | 1, 9 | 0.000038 |

If you did not get any results, then describe the progress that you made nevertheless towards solving the problem and at what point you got stuck.

NA

Upload this file and your code on Quanta.