

HW #2

Let's consider the function $f(x) = -0.1x^4 - 0.15x^3 - 0.5x^2 - 0.25x + 1.2$

We want to use the following formula to approximate the first derivative of f at $x=0.5$:

$$f'(x) \approx \frac{f(x+h) - f(x-h)}{2h} \quad (\text{second order approximation})$$

- Write a code that will compute and display the approximations of $f'(0.5)$ for $h=1, 0.1, 0.001, 0.0001, \dots, 10^{-10}$
The code will also have to compute and display the true error for each h . (I am sure you can figure out the true value...)
- Plot the true error vs the step size.
- Comment on your answers and your graph. (analyze the benefit of reducing the step size, that is reducing the truncating error versus the round off error)
- write a short but proper report.