

Computational Homework 1, due Oct. 23rd

Write a program to carry out Newton's method on a function f assuming that a starting point p_0 is given.

Test the routine on

1. $f(x) = x^2 - 13$ in starting with $p_0 = -1$ and $p_0 = 2$
2. $f(x) = \frac{1}{2}x^2 + x + 1 - \exp x$ with $p_0 = 1$

For both functions, calculate the error e_n and the residual r_n at each iteration. Is it converging quadratically to p ? If not, explain why. Note that $p = \sqrt{13} \approx 3.60555123$ for $f(x) = x^2 - 13$ and $p = 0$ for $f(x) = \frac{1}{2}x^2 + x + 1 - \exp x$ where $f(p) = 0$.