

Homework No 3 Newton and secant methods rates of convergence

1. Compare the Newton method and the secant method to find the sequence of errors:

$$\{x_k^2 - 4\}$$

- a. For Newton method start at the point
 $x_0 = 2.5$

for iterations $k = 1, 2, \dots, 7$.

Write a small code to implement Newton method using double precision.

Plot the sequence of errors versus number of iterations on a semi log graph.

What is the convergence rate from reading the slope of the graph?

- b. For the secant method use the initial starting points: $x_0 = 1$, and $x_1 = 2.5$
for iterations $k = 1, 2, \dots, 7$.

And again write a small code to implement the secant method and plot the sequence of errors versus number of iterations on a semi log graph.

What is the convergence rate of the secant method from reading the slope of the graph?

Comment after reading theoretical derivation of corresponding rates of convergence of Newton and secant method.