Tufts University
Department of Mathematics
Fall 2018

MA 126: Numerical Analysis

Homework 5 (v1.0) [1]

Assigned Friday 5 October 2018
Due Friday 12 October 2018 at 3 pm

1. Let $f(x) = x^m$ when m is a positive integer. Show that Newton's method for the root at $x = 0$ converges linearly, not quadratically, with a coefficient λ given by Eq. (3.63) in the book.

2. Let $f(x) = (x - \alpha)^m h(x)$ when m is a positive integer, where $h(\alpha) \neq 0$, and where h and its first two derivatives are continuous in an open neighborhood of $x = \alpha$. Show that Newton's method converges linearly, with a coefficient λ given by Eq. (3.63) in the book.

3. Let $f(x) = \sqrt{|x|}$. How does Newton's method work for the root at $x = 0$?

4. Atkinson & Han, Section 4.1, Problem 12

5. Atkinson & Han, Section 4.1, Problem 13

6. Atkinson & Han, Section 4.1, Problem 33

7. Atkinson & Han, Section 4.1, Problem 34