Tufts University
Department of Mathematics
Fall 2018

MA 126: Numerical Analysis

Homework 4 (v1.0) [1]

Assigned Friday 28 September 2018
Due Friday 5 October 2018 at 3 pm

1. To an accuracy of 10^{-15}, find the smallest positive root to $\tan x = \cos x$, using

   (a) the bisection method. Make sure you justify your upper and lower bounds.

   (b) Newton's method. In addition to the root, figure out the basin of attraction.

2. We would like to derive Eq. (3.28) in Atkinson and Han, which gives the absolute error of the secant method at time $n + 1$. Toward this end, carry out Problem 7 in Section 3.3. Once the result of that problem is established, Eq. (4.24) can be used to obtain the final result. Of course, we have not yet proven Eq. (4.24), but we will get to it later on in the course; for now, you can use the result without proof.