Project 1:

Part 1: Aitken’s delta-squared process

Problem 1: Consider the problem of approximating the root of using Fixed-Point iteration.

Part A: Show that the root of is also a fixed point of the function .

Begin with the function . Finding the root is equivalent to finding the value of which satisfies the equation:

(1)

Rewriting equation (1) gives:

(2)

(3)

Defining gives:

(4)

Finding the value of which satisfies is equivalent to finding the fixed point of . Because this is the same value of that gives , the root of is the same as the fixed point of .

Part B: Use the Fixed-Point Theorem to show that Fixed-Point Iteration with will converge to for any in the interval .

Theorem 2.4 states that