

MAST30013 – Techniques in Operations Research

Semester 1, 2021

Tutorial 2

1. Consider the function

$$f(x) = x \log x - x + 5.$$

It is known that there is a minimum of f in the interval $[0.5, 1.2]$. Apply both the Method of False Position and Newton's Method to estimate the minimum of f . Use a tolerance of 0.01. For Newton's Method use a tolerance of 0.001 to check the size of $|f'(a)|$ at each iteration.

Compare your results.

2. Draw the graph of an increasing function g for which the Method of False Position will be slow in converging to x_{\min} where $g(x_{\min}) = 0$.

How would the convergence of Newton's method compare for your example of g ?

3. Consider minimising the function $f(x) = (x - 3)^2$. Using the procedure to find a step size that satisfies Armijo-Goldstein and Wolfe conditions, find an interval on which a search technique can be used to find x_{\min} . Use $\sigma = \frac{1}{2}$, $\mu = \frac{3}{4}$, and $T = 10$.