Numerical Analysis Homework 2

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1 Problem 1

Use Newton's method to find solutions accurate to within 10^{-4} for the following problems:

1.1 $x^3 - 2x^2 - 5 = 0$, $[1, 4]$

1.2 $x - cosx = 0$, $[0, \pi/2]$

2 Problem 2

Repeat Problem 1 using Secant method

2.1 $x^3 - 2x^2 - 5 = 0$, $[1, 4]$

2.2 $x - cosx = 0$, $[0, \pi/2]$

3 Problem 3

3.1 Show that the sequence $p_n = 10^{-2^n}$ converges quadratically to 0

3.2 Show that the sequence $p_n = 10^{-n^k}$ does not converge to 0 quadratically, regardless of the size of the exponent $k > 1$

4 Problem 4

Let $f(x) = x^3 - 5x^2 + 6.9999x = 2.9997$. Find the absolute condition number for the problem **"find the root of f nearest $x = 1.011$"**