Numerical Analysis MAT 362: Homework 1

Due on Wednesday, January 30 in class

Instructions

- Answer all the problems.
- **You will be graded on the readability of your work.**
- **The correct answer with no or incorrect work will earn you NO marks**
- **Show ALL your work**
- Use only four decimal places for all numbers.

Problem 1

Show that the following equations have at least one solution in the given interval.

(a) $x \cos x - 2x^2 + 3x - 1 = 0, \quad [0.2, 0.3]$

(b) $x - (\ln x)^x = 0, \quad [4, 5]$

Problem 2

Find c satisfying the Mean Value Theorem for $f(x)$ on the interval $[0, 1]$.

(a) $f(x) = e^x$

(b) $f(x) = x^2$

Problem 3

Find the fifth iteration (c_5) of the Bisection Method to approximate the root of $f(x) = \sqrt{x} - \cos x = 0$ on $[0, 1]$.

Problem 4

Find n for which the nth iteration by the Bisection Method guarantees to approximate the root of $f(x) = x^4 - x^3 - 10$ on $[2, 3]$ with accuracy within 10^{-8}.