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Math 351 – Numerical Analysis

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HW 2

**Compute x = ln b = logeb, b is positive.**

1. Equation in form f(x) = 0 and b is root. Newton’s method to derive an algorithm for computing approximate solution. May use exponential function, but not log.
2. For what choices of initial guess x0 does the iteration coverage. Include diagram of iteration (graph of f and some tangent lines).

Note: Disregard overflow, underflow in finite-precision floats.

1. Ill conditioning of roots of polynomials.

For any positive integer n, let

for all real x. Roots = 1, 2, …, n.

*Perturbed polynomial:*

1. Execute the line in pert.m

format long

n=2;

n=5; % Try these values as well.

n=10;

n=20;

n=21;

p = poly(1:n);

r = roots(p)

1. Given n =7, perturb the coefficient of x6 by subtracting 0.002 of that coefficient. (Example 3.5.4, p 112-113).

Use roots function to compute the roots of the unperturbed polynomial () and perturbed () polynomial.

Display the roots of these polynomials side-by side in adjacent columns of an array.

Use format long.

1. Explain the difference between the unperturbed polynomial () and perturbed () polynomial using graphs. (2 of the roots of isn’t real).