Worksheet 3 — Numerical Analysis Fall 2024

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Work in groups of 2. Move your chairs if needed.

Problem 1. Define $N = 2^{32}$ equally spaced numbers between a and b by

$$z_i = a + (b-a)\frac{i}{N-1}, \qquad i = 0, 1, \ldots, N-1.$$

- Suppose we want to represent numbers as large as $\pm 1,000,000,000$. What is the smallest the spacing between consecutive z_i can be?

- Suppose we want to be able to represent numbers to 8 decimal points; i.e. to be able to differentiate between 3.14159265 and 3.14159264. What is the largest $b - a$ can be?

Problem 2. When you want to write down a very large or very small numbers, how do you usually do it?