

Homework problem #1 - Spring 2023 MATH 128A

Numerical Analysis

You may not use the following symbols in your write ups:

$$\forall, \exists, \Leftarrow, \Rightarrow, \Leftrightarrow, \neg, \sim, \vee, \wedge, \therefore, \because$$

Instead, write out “for all”, “there exists”, “implies”, “if and only if”, “not”, “or”, “and”, “therefore”, “because” and so forth.

Each section of our textbook may have several collections of problems. Here

“§X.Y problem” and “§X.Y computer problem”

refer to exercises from “Problems X.Y” and “Computer Problems X.Y” respectively.

1. Kincaid and Cheney - §1.1 problem #4
2. Kincaid and Cheney - §1.1 problem #8
3. Kincaid and Cheney - §1.1 problem #18 - Revise the problem from $C^n(\mathbf{R})$ to $C^n[0, \infty)$
4. Kincaid and Cheney - §1.1 problem #32
5. Kincaid and Cheney - §1.2 problem #2
6. Kincaid and Cheney - §1.2 problem #6
7. Kincaid and Cheney - §1.2 problem #22
8. Kincaid and Cheney - §1.2 problem #26
9. Kincaid and Cheney - §1.2 problem #35
10. Kincaid and Cheney - §1.2 problem #40
11. Let (x_n) be a sequence in \mathbf{R} where $x_n \rightarrow x \in \mathbf{R}$ and

$$x_n \neq x$$

for all $n \in \mathbf{N}$.

Show (x_n) converges superlinearly to x if and only if

$$\lim_{n \rightarrow \infty} \frac{|x_{n+1} - x|}{|x_n - x|} = 0.$$