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3.7.1 Finger Exercise: Optimization fundamentals and gradient descent

Finger Exercises 4 due Sep 7, 2023 05:00 IST Completed

MO2.11 MO2.12

Consider the function

$$f(x) = x^4 + x^3 - 2x^2 \tag{3.32}$$

over the interval $-2 \leq x \leq 1$. For your own reference, we suggest plotting this function on a grid with sufficiently fine spacing in x. From your plot, answer the following questions.

Problem: Determine number of mins and maxes

4.0/4.0 points (graded)

How many minimums (local and global) does the function have on this interval? Don't count the endpoints.

2 ✔ Answer: 2

How many maximums (local and global) does the function have on this interval? Don't count the endpoints.

1 ✔ Answer: 1

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Answers are displayed within the problem

Problem: Convergence of gradient descent

2.0/2.0 points (graded)

Suppose the gradient descent method is applied starting from the point $x = -0.1$. Assume that the step size is chosen small enough so that the method does converge to a minimum. What will the value of f min

- $f \approx 0.0$
- $f \approx -0.4$
- $f \approx -2.8$

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