You are taking "Exam (Timed, No Correctness Feedback)" as a timed exam. Show more

End My Exam 26:01:03

Previous Next

2. Motivation

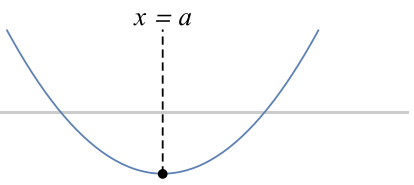
Bookmark this page

Review

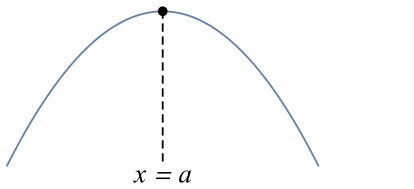
In the last lecture we saw a graphical way to classify critical points of a function $f(x, y)$ using the gradient field. However, we do not always have access to the gradient field, so we need a way to classify critical points algebraically. In single variable calculus, we used the **second derivative test**.

Suppose that $x = a$ is a critical point of $f(x)$, with $f'(a) = 0$.

- If $f''(a) > 0$, then $f(x)$ has a local minimum at $x = a$.



- If $f''(a) < 0$, then $f(x)$ has a local maximum at $x = a$.



- If $f''(a) = 0$, or does not exist, then the test is inconclusive — there might be a local maximum, or a local minimum, or neither.

The second derivative of $f(x)$ tells us something about the curvature of the function. This leads us to two questions:

1. What is the second derivative test in higher dimensions?
2. How do we compute second derivatives in higher dimensions?

2. Motivation

Hide Discussion

Topic: Unit 3: Optimization / 2. Motivation

Add a Post

Show all posts by recent activity

There are no posts in this topic yet.

Previous Next >

Calculator Hide Notes