9. Gradients and Optimization

Homework0 due Feb 8, 2023 08:59 -03 Completed

Multivariable Calculus Review: Gradient

1.0/1 point (graded)

Let

$$f: \quad \mathbb{R}^d \quad \to \quad \mathbb{R}$$
$$\theta = \begin{pmatrix} \theta_1 \\ \theta_2 \\ \vdots \\ \theta_d \end{pmatrix} \quad \mapsto \quad f(\theta).$$

denote a **differentiable** function. The **gradient** of f is the vector-valued function

$$\nabla_\theta f: \quad \mathbb{R}^d \quad \to \quad \mathbb{R}^d$$
$$\theta = \begin{pmatrix} \theta_1 \\ \theta_2 \\ \vdots \\ \theta_d \end{pmatrix} \quad \mapsto \quad \left. \begin{pmatrix} \frac{\partial f}{\partial \theta_1} \\ \frac{\partial f}{\partial \theta_2} \\ \vdots \\ \frac{\partial f}{\partial \theta_d} \end{pmatrix} \right|_\theta .$$

Consider

$$f(\theta) = \theta_1^2 + \theta_2^2 .$$

Here, θ has dimension 2. Compute the gradient ∇f.

(Enter your answer as a vector, e.g., type **[2,x]** for the vector $\begin{pmatrix} 2 \\ x \end{pmatrix}$. Note the square b

separators. Enter **theta_i** for θ_i.)

$\nabla_\theta f(\theta) =$ [2*theta_1, 2*theta_2]

? STANDARD NOTATION

Submit You have used 1 of 3 attempts

line

✔

Consider how the level curves change as increases from to . D
of have a global maximum, or global minimum, or neither?

global maximum

global minimum

neither

✖

At each point in the -plane, decreases in the direction of...

✔

Submit You have used 2 of 2 attempts

Gradient ascent/descent methods are typical tools for maximizing/minimizing functions
where and . Our goal is to sele
maximize/minimize the value of while keeping fixed.

Compute the Gradient

1/1 point (graded)
The gradient is a vector with components:

Submit You have used 1 of 1 attempt

Gradient Ascent or Descent

0/1 point (graded)

The direction of the derivative of a function gives us the direction of the largest change independent variables vary.

In gradient ascent/descent methods, we make an educated guess about the next value updates that will hopefully eventually converge to the global minimum of (if it

If

where is a small positive real number, Which of the following is true?

Previous Next

? STANDARD NOTATION

- new error message
  Couldn't execute jailed code: stdout: b'', stderr: b'' with status code: -9
- i want ans of question guys...
  i try from 5-6 hr...i didnt get any ans...so plz help me
- Review material
  I haven't seen this kind of calculus before... I got them right from intuition on other calculus but is there a tex
- in the last problem, ' is not a derivative!
- Is the first question, (gradient) complete?
  I honestly think the question is incomplete. Without knowing the dimensions of angle theta, it becomes hard