

<u>Help</u>

sandipan_dey >

<u>Calendar</u> **Discussion** <u>Notes</u> <u>Course</u> <u>Progress</u> <u>Dates</u>

☆ Course / Unit 2: Geometry of Derivatives / Lecture 7: Directional derivatives



Next >

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







☐ Bookmark this page

Previous

Lecture due Aug 18, 2021 20:30 IST Completed



Practice

Practice 1

1/1 point (graded)

Suppose f is a function such that $abla f(2,3)=\langle -5,20
angle$. Let $\hat{u}=\langle 3/5,4/5
angle$. What is $D_{\hat{u}}f(2,3)$?

$$D_{\hat{u}}f(2,3)=$$
 13 \checkmark Answer: 13

Solution:

$$D_{\hat{u}}f(2,3) = \langle -5, 20 \rangle \cdot \langle 3/5, 4/5 \rangle = -3 + 16 = 13$$

Submit

You have used 1 of 3 attempts

• Answers are displayed within the problem

Practice 2

1/1 point (graded)

Let $f(x,y)=y^2+e^x$. Find the directional derivative of f at the point (x,y)=(0,1) in the direction of the unit vector $\hat{u}=\langle \frac{2}{\sqrt{5}},\frac{1}{\sqrt{5}}\rangle$.

$$D_{\hat{u}}f(0,1)= \boxed{ ext{4/sqrt(5)}}$$

? INPUT HELP

Solution:

We have

$$abla f = \langle e^x, 2y
angle$$

and so

$$\nabla f(0,1) = \langle 1,2 \rangle.$$

So we compute

$$D_{\hat{u}}f\left(0,1
ight)=
abla f\left(0,1
ight)\cdot\hat{u}=\left\langle 1,2
ight
angle\cdot\left\langle rac{2}{\sqrt{5}},rac{1}{\sqrt{5}}
ight
angle =rac{4}{\sqrt{5}}.$$

1 Answers are displayed within the problem

Practice 3

1/1 point (graded)

Let $g\left(x,t
ight)=\sin\left(x-t
ight)$. Find the directional derivative of g at the point $\left(x,t
ight)=\left(\pi,0
ight)$ in the direction of the unit vector $\hat{\pmb{u}} = \langle \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \rangle$.

$$D_{\hat{u}}g\left(\pi,0
ight)= igcap 0$$
 $ightharpoonup Answer: 0$

Solution:

We have

$$abla g = \left\langle g_x\left(x,t
ight), g_t\left(x,t
ight)
ight
angle = \left\langle \cos\left(x-t
ight), -\cos\left(x-t
ight)
ight
angle$$

and so

$$abla g\left(\pi,0
ight) =\langle -1,1
angle .$$

So we compute

$$D_{\hat{u}}g\left(\pi,0
ight)=
abla g\left(\pi,0
ight)\cdot\hat{u}=\left\langle -1,1
ight
angle \cdot\left\langle rac{1}{\sqrt{2}},rac{1}{\sqrt{2}}
ight
angle =0.$$

Submit

You have used 1 of 5 attempts

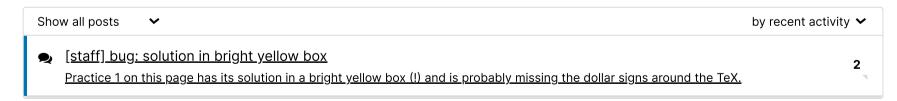
1 Answers are displayed within the problem

4. Practice computing directional derivatives

Hide Discussion

Topic: Unit 2: Geometry of Derivatives / 4. Practice computing directional derivatives

Add a Post



Previous

Next >

© All Rights Reserved



edX

About

<u>Affiliates</u>

edX for Business

Open edX

Careers

<u>News</u>

Legal

Terms of Service & Honor Code

Privacy Policy

Accessibility Policy

Trademark Policy

<u>Sitemap</u>

Connect

Blog

Contact Us

Help Center

Media Kit

Donate















© 2021 edX Inc. All rights reserved.

深圳市恒宇博科技有限公司 <u>粤ICP备17044299号-2</u>