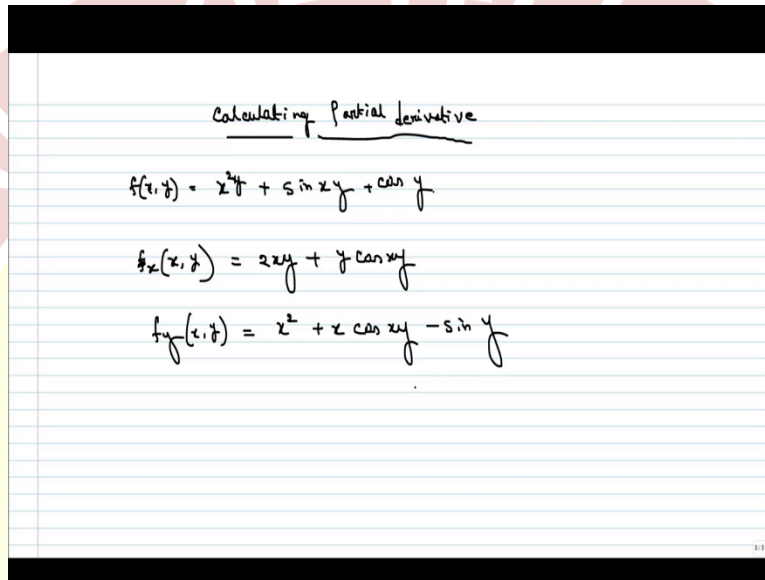


IIT Madras
ONLINE DEGREE

Mathematics for Data Science 2
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Week 10 - Tutorial 02

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Calculating Partial derivative

$$f(x, y) = x^2y + \sin xy + \cos y$$
$$f_x(x, y) = 2xy + y \cos xy$$
$$f_y(x, y) = x^2 + x \cos xy - \sin y$$

Hello everyone, now let us try to calculate the partial derivative of this function. This is again a scalar valued function of two variable. So, when we are calculating the partial derivative with respect to x , that is we are calculating $f_x(x, y)$. So, we will consider y to be the constant. So, for the first term it is, if y is constant, we will only take the derivative with respect to x , so $2xy$. Now, for $\sin xy$, y is constant, so y will come up and for $\sin xy$ it is $\cos xy$. And as $\cos y$ is constant here as y is constant. So, this will give us 0. So, this is our f_x .

Now, what is our f_y ? So, $f_y(x, y)$ is nothing but, now we are treating x as the constant. So, x^2 is constant here, so we will get x^2 and if we take the derivative of y , we will get 1. So, the first term will be x^2 . And for the second term, again, x is constant, so x will come up, and it will be $\cos xy$. And for the last term now $\cos y$, now it is a variable, so we will get $-\sin y$. So, these two other partial derivative of $f(x, y)$. Thank you.