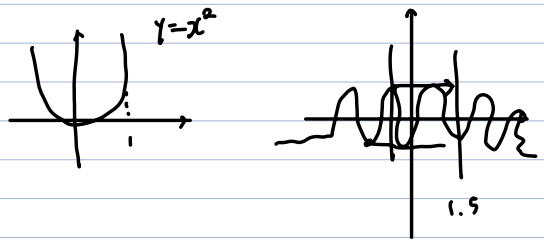


Chain Rule

1. $z=f(x,y) = 4x^2+3y^2$, $z = x(t) = \sin(t)$, $y = y(t) = \cos t$

$z = 4x^2+3y^2$ $\quad \frac{dz}{dt} = \frac{dz}{dx} \times \frac{dx}{dt} + \frac{dz}{dy}\frac{dy}{dt}$

$4x\sin^2+3x\cos^2$ $\quad = \frac{dz}{dt} \quad = \frac{dz}{dt}$

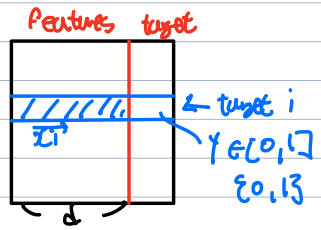
$= 3+\sin^2$

$\sin^2+\cos^2 = 1$ $\quad = 2 \cdot \sin t \cdot \cos t$

Gradient Partial derivative

$f(x,y) = x^2-xy+3y^2$ $\quad dz = \left[\frac{dz}{dx}, \frac{dz}{dy}\right]$

$= [8x+6y]$



$y_i = \sum_j \theta_j \cdot x_j$ $\quad \vec{\theta} = [\theta_1, \ldots \theta_d]$

$\vec{y} = [y_1, y_2, \ldots y_n]$ $\quad \vec{y} = X \cdot \theta$

$x = \begin{bmatrix} x_{i1} \\ x_{i1} \\ \vdots \\ x_{in} \end{bmatrix}$  row > column Not consistent, → no inverse

$\|x_0 - y\|^2$ $\quad \|x\|^2 = \sum x_i^2 = x^T \cdot x$

$= \langle x, x \rangle$

↓

How can we minimize this value?