

TUGAS PRAKTIKUM PERTEMUAN 5  
PENGANTAR MATEMATIKA KOMPUTASIONAL

1. Tentukan  $\frac{dz}{dt}$  dari  $z = \ln(x + 2y)$  dengan  $x = \sin t$  dan  $y = \cos t$

$$z = \ln(x + 2y), \quad x = \sin t, \quad y = \cos t$$

$$\begin{aligned} \frac{dz}{dt} &= \frac{\partial z}{\partial x} \cdot \frac{dx}{dt} + \frac{\partial z}{\partial y} \cdot \frac{dy}{dt} \\ &= \frac{1}{(x + 2y)} \cdot \cos x + \frac{2}{(x + 2y)} \cdot (-\sin x) \\ &= \frac{\cos x - 2 \sin x}{x + 2y} \end{aligned}$$

2. Tentukan  $\frac{dz}{dx}$  dari  $f(x, y) = \sqrt{x} + xy^3 = 0$  menggunakan diferensiasi implisit dan aturan rantai implisit

$$f(x, y) = \sqrt{x} + xy^3 = 0$$

diferensiasi implisit

$$\sqrt{x} + xy^3 = 0$$

$$uv = u'v + uv'$$

$$\frac{1}{2\sqrt{x}} dx + 1 dx \cdot y^3 + x \cdot 3y^2 \cdot dy = 0$$

$$\frac{1 + 2y^3\sqrt{x}}{2\sqrt{x}} \cdot dx + 3xy^2 \cdot dy = 0$$

$$3xy^2 \cdot dy = - \frac{1 + 2y^3\sqrt{x}}{2\sqrt{x}} dx$$

$$\frac{dy}{dx} = \frac{-1 + 2y^3\sqrt{x}}{6x\sqrt{x}y^2} = \frac{-\sqrt{x} + 2xy^3}{6x^{\frac{3}{2}}y^2}$$

Akuron rental implisit

$$f(x, y) = \sqrt{x} + xy^3 = 0$$

$$\frac{\partial y}{\partial x} = - \frac{\partial f / \partial x}{\partial f / \partial y}$$

$$= - \frac{(1/2\sqrt{x}) + y^3}{3xy^2}$$

$$= - \frac{1 + 2y^3\sqrt{x}}{6x\sqrt{x}y^2}$$

$$= - \frac{\sqrt{x} + 2xy^3}{6x^2y^2}$$

$$= - \frac{\sqrt{x} + 2xy^3}{6x^2y^2}$$