

①

$$\alpha(h, k) = \frac{f(a+h, b+k) - f(a, b) - f'_x(a, b) \cdot h - f'_y(a, b) \cdot k}{\sqrt{h^2 + k^2}}$$

$$\alpha(h, k) \cdot \sqrt{h^2 + k^2} = f(a+h, b+k) - f(a, b) - f'_x(a, b) \cdot h - f'_y(a, b) \cdot k$$

$$f(a+h, b+k) = f(a, b) + f'_x(a, b) \cdot h + f'_y(a, b) \cdot k + \alpha(h, k) \cdot \sqrt{h^2 + k^2}$$

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$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \downarrow \\ 0 & 0 & 0 \end{array}$$

$$|f(a+h, b+k) - f(a, b)| \leq F > 0$$

 $\Leftrightarrow$ 

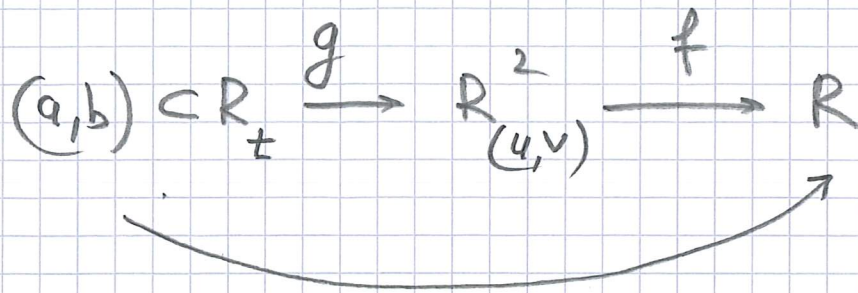
$$-F \leq f(a+h, b+k) - f(a, b) \leq F$$

 $\Leftrightarrow$ 

$$f(a, b) - F \leq f(a+h, b+k) \leq f(a, b) + F$$

d. v. s.

$$f(a+h, b+k) \in [f(a, b) - F, f(a, b) + F]$$



$$f \circ g = h$$

$$\begin{array}{ccc}
 \bullet t & \longrightarrow & (g_1(t), g_2(t)) \longrightarrow f(g_1(t), g_2(t)) \\
 & & \parallel \\
 & & h(t)
 \end{array}$$

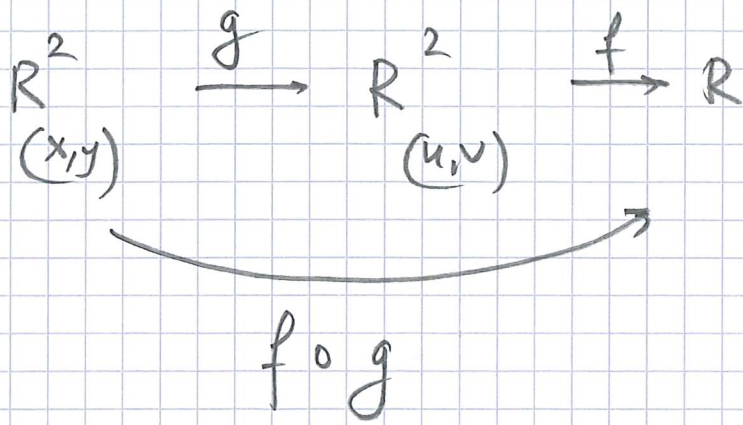
$$\underline{h'(t) = ?}$$

obs

$$\frac{df}{dt} = \frac{\partial f}{\partial u} \cdot \frac{du}{dt} + \frac{\partial f}{\partial v} \cdot \frac{dv}{dt}$$

$$df = \frac{\partial f}{\partial u} \cdot du + \frac{\partial f}{\partial v} \cdot dv$$





$$\bullet (x,y) \xrightarrow{g} (u(x,y), v(x,y)) \xrightarrow{f} \bullet f(u(x,y), v(x,y)) \\
 \parallel \\
 h(x,y)$$

$$\frac{\partial h}{\partial x}, \quad \frac{\partial h}{\partial y} = ?$$

$$\left[ \begin{array}{l}
 \frac{\partial f}{\partial x} = \frac{\partial f}{\partial u} \cdot \frac{\partial u}{\partial x} + \frac{\partial f}{\partial v} \cdot \frac{\partial v}{\partial x} \\
 \frac{\partial f}{\partial y} = \frac{\partial f}{\partial u} \cdot \frac{\partial u}{\partial y} + \frac{\partial f}{\partial v} \cdot \frac{\partial v}{\partial y}
 \end{array} \right.$$