

Dérivée d'une composée.

$$\textcircled{1} \cdot g : t \mapsto f(u(t)) \quad g'(t) = u'(t) \cdot f'(u(t))$$

$$\textcircled{2} \cdot g : t \mapsto f(x(t), y(t)) \quad g'(t) = (x'(t); y'(t)) \cdot \left( \frac{\partial f}{\partial x}; \frac{\partial f}{\partial y} \right) (x(t), y(t))$$

$$\textcircled{3} \quad g : (x, y) \mapsto f(u(x, y), v(x, y))$$

$$\begin{matrix} \text{"} & & \text{"} \\ \begin{pmatrix} \frac{\partial g}{\partial x} \\ \frac{\partial g}{\partial y} \end{pmatrix} & = & \begin{pmatrix} \frac{\partial u}{\partial x} & \frac{\partial v}{\partial x} \\ \frac{\partial u}{\partial y} & \frac{\partial v}{\partial y} \end{pmatrix} \begin{pmatrix} \frac{\partial f}{\partial x} \\ \frac{\partial f}{\partial y} \end{pmatrix} \\ \text{"} & & \text{"} \end{matrix}$$

$$\frac{\partial g}{\partial x} (u(x, y), v(x, y)) = \frac{\partial u}{\partial x} (x, y) \frac{\partial f}{\partial x} (u(x, y), v(x, y)) + \frac{\partial v}{\partial x} (x, y) \frac{\partial f}{\partial y} (u(x, y), v(x, y))$$

$$\frac{\partial g}{\partial y} (u(x, y), v(x, y)) = \frac{\partial u}{\partial y} (x, y) \frac{\partial f}{\partial x} (u(x, y), v(x, y)) + \frac{\partial v}{\partial y} (x, y) \frac{\partial f}{\partial y} (u(x, y), v(x, y)).$$