- $f: \mathbb{R}^p \longrightarrow \mathbb{R}$
- $\underline{x} = (x_1, \ldots, x_p) \in \mathbb{R}^p$
- $f(\underline{x}) \in \mathbb{R}$ scalar

$$\nabla f(\underline{x}) = \left[\frac{\partial f}{\partial x_1}(\underline{x}), \frac{\partial f}{\partial x_2}(\underline{x}), \ldots, \frac{\partial f}{\partial x_p}(\underline{x}) \right]$$

$$\downarrow$$

$$?$$

$$\forall i: \quad \frac{\partial f}{\partial x_i}(\underline{x}) \approx \frac{f(\underline{x}^{(i)}) - f(\underline{x})}{\delta}$$

where: $\underline{x}^{(i)} = [x_1, \ldots, x_{i-1}, x_i + \delta, x_{i+1}, \ldots, x_p]$