$$f : A \subseteq \mathbb{R}^n \longrightarrow \mathbb{R}$$

f differentiable in $a \in A$ $\iff$

- $\nabla f(a) \in \mathbb{R}^n$ exists

- $\lim_{r \to 0} \dfrac{f(a+r) - f(a) - \nabla f(a) \cdot r}{\|r\|} = 0$

$\longrightarrow$ How to generalize this to vector-valued functions

$$F : A \subseteq \mathbb{R}^n \longrightarrow \mathbb{R}^m \qquad ?$$