Let $f : \mathbb{R}^n \to \mathbb{R}$ be a function, then

$$df = \sum_{i=1}^{n} D_i f \, \Pi_i$$

where

- $D_i f$ is the partial derivative
- $\Pi_i : \mathbb{R}^n \to \{\mathbb{R}^n \to \mathbb{R}\}$ is the function