En funktion, hvor $\lim_{x \to a}\left(\lim_{y \to b} f(x, y)\right)$ og $\lim_{y \to b}\left(\lim_{x \to a} f(x, y)\right)$ begge eksisterer og er forskellige!

Kilde: **Side 118, eksempel 7 i "Counterexamples in Analysis".**

$$f(x, y) := \begin{cases} \dfrac{x^2 - y^2}{x^2 + y^2} & hvis\ (x, y) \neq (0, 0) \\ 0 & hvis\ (x, y) = (0, 0) \end{cases}$$

$$\lim_{x \to 0}(f(x, y)) = \frac{-y^2}{y^2} = -1$$

Derfor er $\lim_{y \to 0}\left(\lim_{x \to 0}(f(x, y))\right) = \lim_{y \to 0}(-1) = -1$

$$\lim_{y \to 0}(f(x, y)) = \frac{x^2}{x^2} = 1$$

Derfor er $\lim_{x \to 0}\left(\lim_{y \to 0}(f(x, y))\right) = \lim_{x \to 0}(1) = 1$

Dvs. $\boldsymbol{\lim_{y \to 0}\left(\lim_{x \to 0}(f(x, y))\right) \neq \lim_{x \to 0}\left(\lim_{y \to 0}(f(x, y))\right)}$