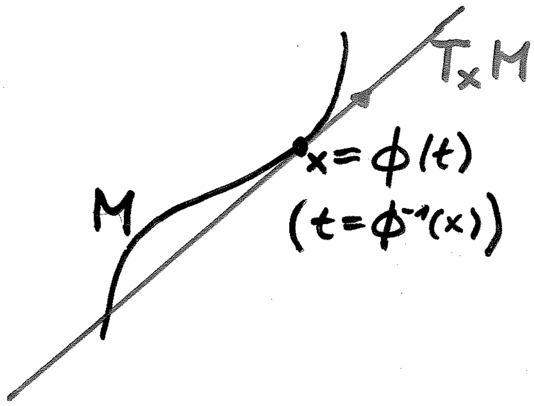
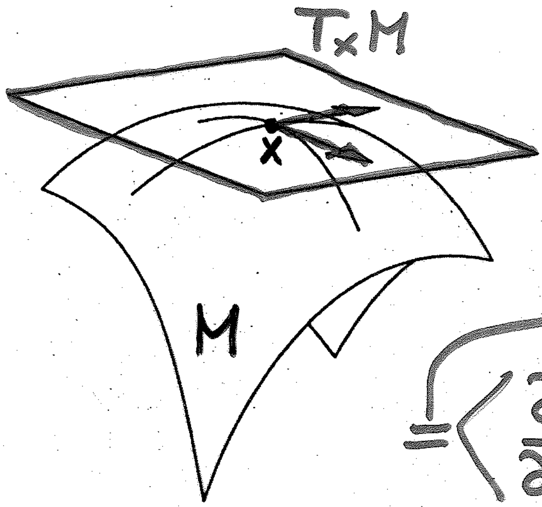
Tangentialvektoren



M = Kurve , Karte ϕ

$$\Longrightarrow \quad T_x M = \left\langle \frac{\partial \phi}{\partial t}(t = \phi^{-1}(x)) \right\rangle_{\mathbb{R}}$$



M = Mannigfaltigkeit, Karte ϕ

$$\Longrightarrow \quad T_x M = \left\{ \begin{array}{l} \text{Tangentialvektoren} \\ \text{an Kurven} \subseteq M \\ \text{durch } x \end{array} \right\}$$

$$= \left\langle \frac{\partial \phi}{\partial t_1}(t = \phi^{-1}(x)), \ldots, \frac{\partial \phi}{\partial t_k}(t = \phi^{-1}(x)) \right\rangle_{\mathbb{R}}$$

Normalenvektoren

$$N_x M = \text{Vektoren} \perp T_x M = \text{Kern } \partial \phi^T (t = \phi^{-1}(x))$$

Satz von Gauß

- $A \subset \mathbb{R}^n$ kompakt, glatter Rand
- $F : A \to \mathbb{R}^n$ stetig, $\operatorname{div} F$ stetig

$$\Longrightarrow \quad \int_A \operatorname{div} F = \int_{\partial A} dS \; \nu \cdot F$$