16. Distribution

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Set of subspaces of the target space of $\mathbb{R}^n$

$\Delta: x \to \Delta(x) \subset T_x \mathbb{R}^n$ (at each point x is associated a subspace Δ_x of the target space $T_x \mathbb{R}^n$)

$\Delta(x) = \text{span}\{\tau_1(x), \dots, \tau_d(x)\}$

if $d = \text{constant} \rightsquigarrow \rho(\Delta) = d$ Non singular distribution

Integral variety (Integration of a distribution)

A distribution is completely integrable if $\rho(\Delta) = d$ and $\exists\ \lambda_1, \dots, \lambda_{n-d} : \mathbb{R}^n \to \mathbb{R}$ s.t.

$\frac{\partial \lambda_i}{\partial x} \Delta(x) = \frac{\partial \lambda_i}{\partial x} (\tau_1(x), \dots, \tau_d(x)) = 0 \quad i = 1, \dots, n-d$