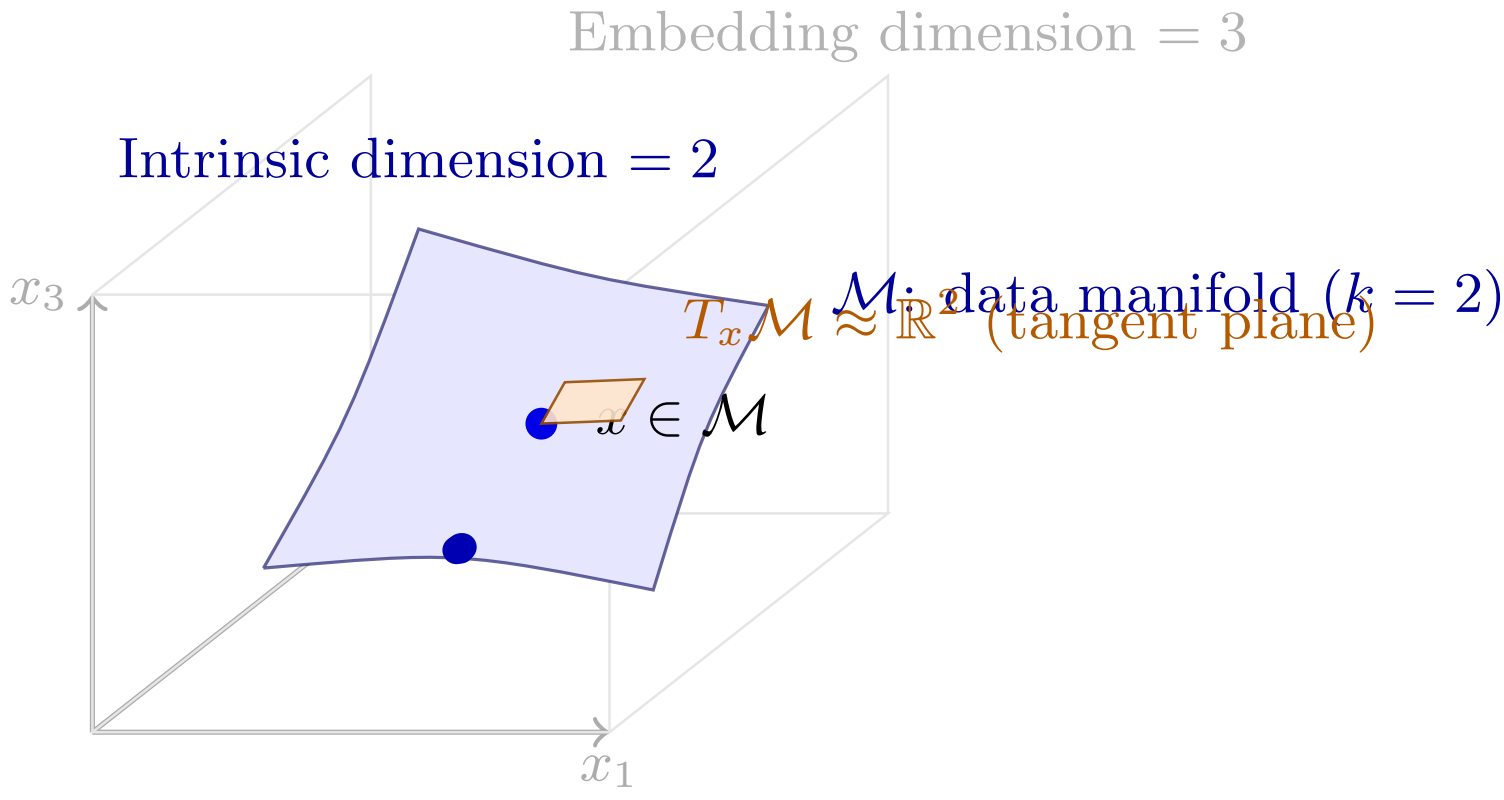

Manifold perspective.

Data in $\mathbb{R}^3$ (embedding dim $= 3$) often lies near a smooth, curved surface $\mathcal{M}$ of lower intrinsic dimension ($k = 2$).

Locally, $\mathcal{M}$ is well-approximated by the tangent plane $T_x\mathcal{M}$, which behaves like $\mathbb{R}^2$.