



Why

Given a vector $x \in \mathbf{R}^n$ and a subspace $S \subset \mathbf{R}^n$, what is the closest point in S to x .

Result

Proposition 1. *Suppose $U \in \mathbf{R}^{n \times k}$ with $U^\top U = I$. Then*

$$\text{proj}_U(x) = UU^\top x$$

