



Matrix notation

Let $u_1, \dots, u_k \in \mathbf{R}^n$. Define $U \in \mathbf{R}^{n \times k}$ so that

$$U = \begin{bmatrix} u_1 & u_2 & \cdots & u_k \end{bmatrix}.$$

Then $\{u_1, \dots, u_k\}$ is an orthonormal set mean

$$U^\top U = I_k$$

Notice that if $k < n$, $UU^\top \neq I$, since its rank is at most k .

