

EECS 16B

Designing Information Devices and Systems II

Department of Electrical Engineering and Computer Sciences

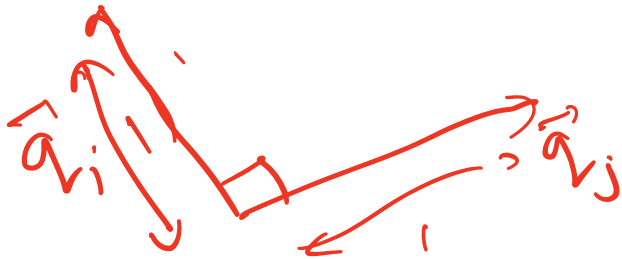
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Orthonormal Bases

$\vec{q}_1, \dots, \vec{q}_n$ are called orthonormal

$$\text{if } \vec{q}_i \cdot \vec{q}_j = \begin{cases} 0 & \text{if } i \neq j \\ 1 & \text{if } i = j \end{cases}$$



$$Q = [\vec{q}_1 \ \dots \ \vec{q}_n]$$

where Q is $m \times n$ matrix
with $m \geq n$

If $m > n$, Tall matrix
 $m = n$ square matrix.

Let $Q = [\vec{q}_1 \ \dots \ \vec{q}_n]$ have
orthonormal column vectors.

$$\text{Then, } Q^T Q = I_n$$

Properties of Orthogonal Matrices

Least Squares & Orthogonal Matrices