

# Orthogonal Sets

If for set  $\{\vec{u}_1, \dots, \vec{v}_n\}$  for  $j \neq k$ ,  $\vec{u}_j \perp \vec{u}_k$ .

If Set S is orthogonal, the vectors of S are linearly independent.

## Expansion in Orthogonal Basis

If we have an Orthogonal Basis  $\{\vec{u}_1, \dots, \vec{v}_n\}$  in  $\mathbb{R}^n$  then for any  $\vec{w} \in \mathbb{R}^n$ ,

$$\vec{w} = c_1\vec{u}_1 + \dots + c_n\vec{v}_n$$

$C_q$  can be found using  $c_q = \frac{\vec{w} \cdot \vec{u}_q}{\vec{u}_q \cdot \vec{u}_q}$