

## Orthogonal Decomposition of Vector $y$

$$\mathbb{R}^n = V_1 \oplus V_2 \oplus V_3$$

$$y = P_1y + P_2y + P_3y$$

$$\|y\|^2 = \|P_1y\|^2 + \|P_2y\|^2 + \|P_3y\|^2$$

