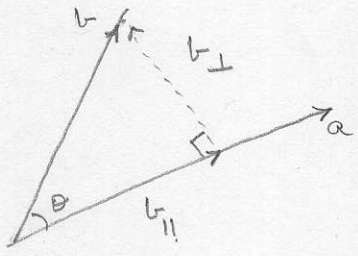
ORTHOGONAL PROJECTION



ORTHOGONAL PROJECTION OF VECTOR b ON VECTOR a $= \|b\| \cos\theta \triangleq q$

↑ LENGTH OF VECTOR b

$$q = \|b\| \cos\theta$$

$$= \frac{\|a\| \|b\| \cos\theta}{\|a\|} .$$

$$= \frac{a^T b}{\|a\|}$$

$$b_{\|} = q \frac{a}{\|a\|} = \frac{a^T b}{\|a\|^2} a$$

$$= \left(\frac{a^T b}{a^T a} \right) a$$

□