Dot Product

The dot product of two vectors u and v is denoted by $u \cdot v$.

$$ec{u}=\langle u_1,u_2,u_3
angle, ec{v}=\langle v_1,v_2,v_3
angle \ u\cdot v=u_1v_1+u_2v_2+u_3v_3$$

The Angle Between Two Vectors u and v is,

$$heta = \cos^{-1}\left(rac{ec{u}\cdotec{u}}{||ec{u}||\ ||ec{v}||}
ight)$$

Dot product of two vectors u and v is also given by,

$$ec{u} \cdot ec{v} = ||ec{u}|| \, ||ec{v}|| \cos heta$$

Projection,

$$\mathrm{proj}_b a = \left(rac{a \cdot b}{||b||}
ight)rac{b}{||b||}$$

scalar component of a in the direction of b,

$$\mathrm{comp}_b a = rac{a \cdot b}{||b||} = ||a|| \cos heta$$

Properties