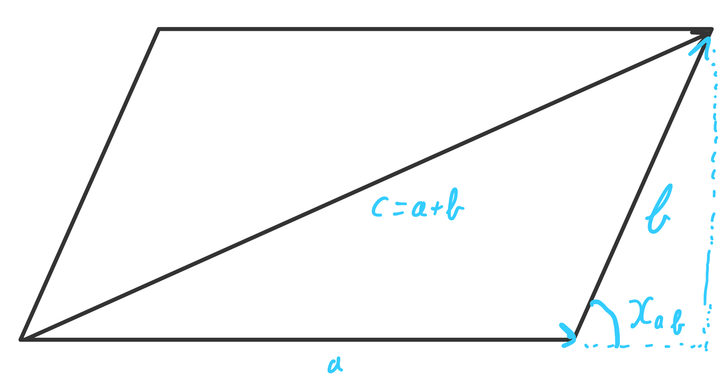
9) $\cancel{a \cdot (\mu_1 b_1 + \mu_2 b_2) = \|a\| \, \|\mu_1 b_1 + \mu_2 b_2\| \cos \chi}$

$$a \cdot (\mu_1 b_1 + \mu_2 b_2) = (\mu_1 b_1 + \mu_2 b_2) \cdot a$$
$$= \mu_1 (b_1 \cdot a) + \mu_2 (b_2 \cdot a)$$
$$= \mu_1 (a \cdot b_1) + \mu_2 (a \cdot b_2)$$

$\cancel{= \mu_1 (a \cdot b_1) + \mu_2 (a \cdot b_2)}$

10)

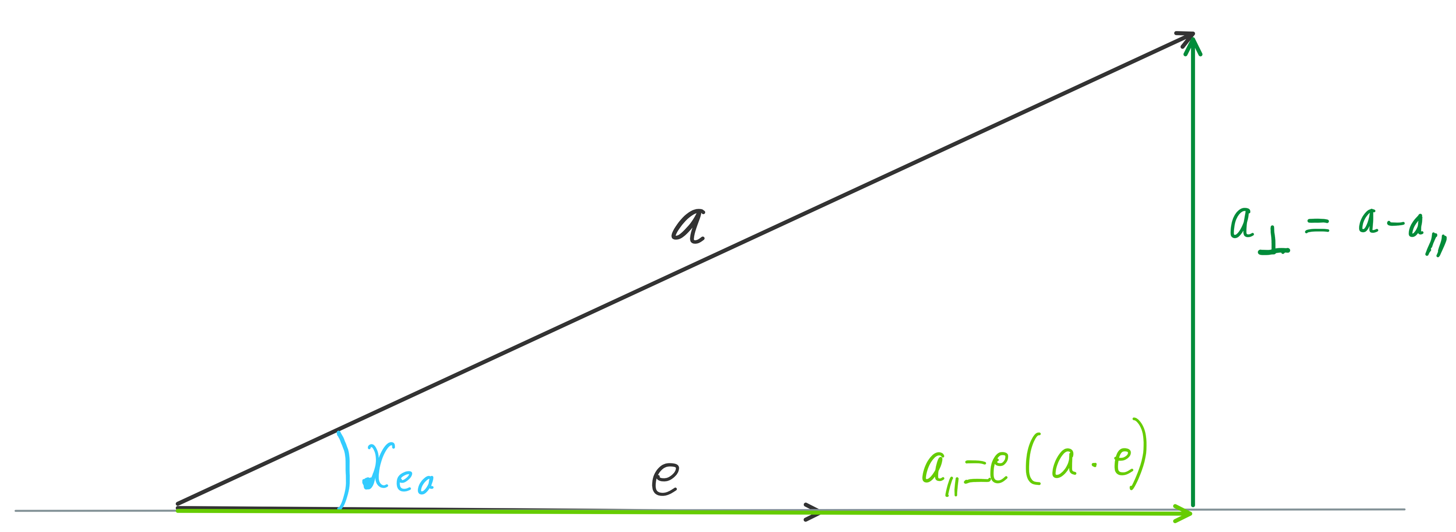


$$\|c\|^2 = (a+b)\cdot(a+b) = a\cdot(a+b) + b\cdot(a+b) = a\cdot a + a\cdot b + b\cdot a + b\cdot b = \|a\|^2 + \|b\|^2 + a\cdot b + b\cdot a = \|a\|^2 + \|b\|^2 + 2a\cdot b = \|a\|^2 + \|b\|^2 + 2\|a\|\|b\|\cos\chi_{ab}$$

If $\chi_{ab} = 90°$, the $\cos\chi_{ab} = 0$ and hence $\|c\|^2 = \|a\|^2 + \|b\|^2$

$\cancel{\|c\|^2 = \|a+b\|^2 = \|a+b\|\|a+b\| = \frac{(a+b)\cdot(a+b)}{\cos(\chi_{(a+b)(a+b)})} =}$

11)



$a_\parallel$ is the component of a parallel to e ; $a_\perp$ is the component of a orthogonal to e

$$a \cdot e = \|a\|\|e\|\cos\chi_{ae} = \|a\|\|e\|\cos\chi_{ea} = \|a\|\cos\chi_{ea}$$

This is the length of the orthogonal projection of a onto e.

12)

$$(a\ b\ c) = a\cdot(b \times c)$$
$$= a \cdot (\|b\|\|c\| \sin\chi_{bc} e_{\perp bc})$$
$$= \|a\| \cdot \|(\|b\|\|c\| \sin\chi_{bc})\| \cos(?_1)$$
$$=$$
$$= \|c\| \cdot \|(\|a\|\|b\| \sin\chi_{ab})\| \cos(?_2)$$
$$= c \cdot (\|a\|\|b\| \sin\chi_{ab} e_{\perp ab})$$
$$= c \cdot (a \times b)$$
$$= (c\ a\ b)$$

$\sin(\chi_{bc})\cos(?_1) = \sin(\chi_{ab})\cos(?_2)$

why?