1 Kronecker delta Symbol

From the definition of the **Kronecker delta symbol** (Equation (1.14))

$$\delta_{ik} = \begin{cases} 0 & \text{if } i \neq k \\ 1 & \text{if } i = k \end{cases} \tag{1.14}$$

2 Levi-Civita Symbol

and **permutation symbol** (or **Levi-Civita density**) (Equation (1.67))

$$\epsilon_{ijk} = \begin{cases} 0 & \text{if any index is equal to any other index} \\ 1 & \text{if } i,j,k \text{ form and } \textit{even} \text{ permutation of 1,2,3 ,} \\ -1 & \text{if } i,j,k \text{ form and } \textit{odd} \text{ permutation of 1,2,3} \end{cases} \tag{1.67}$$

3 Pythagorean identity

$$\sin^2(\alpha - \beta) + \cos^2(\alpha - \beta) = 1 \tag{1}$$

4 If you want to put a cancel mark

$$\begin{aligned}\sum_{j,k} \epsilon_{ijk}\ \epsilon_{ljk} &= \cancel{\epsilon_{i11}\ \epsilon_{l11}} + \epsilon_{i12}\ \epsilon_{l12} + \epsilon_{i13}\ \epsilon_{l13} + \epsilon_{i21}\ \epsilon_{l21} + \cancel{\epsilon_{i22}\ \epsilon_{l22}} + \epsilon_{i23}\ \epsilon_{l23} \\ &\quad + \epsilon_{i31}\ \epsilon_{i31} + \epsilon_{i32}\ \epsilon_{l32} + \cancel{\epsilon_{i33}\ \epsilon_{l33}} \\ &= \epsilon_{i12}\ \epsilon_{l12} + \epsilon_{i13}\ \epsilon_{l13} + \epsilon_{i21}\ \epsilon_{l21} + \epsilon_{i23}\ \epsilon_{l23} + \epsilon_{i31}\ \epsilon_{i31} + \epsilon_{i32}\ \epsilon_{l32}\end{aligned}$$

5 Scalar Product

and the definition of the **scalar product** (Equation 1.52),

$$\vec{A} \cdot \vec{B} = \sum_i A_i B_i \tag{1.52}$$

6 Vector Product

From the Equation 1.66 (the components of **vector product**), when $\vec{C} = \vec{A} \times \vec{B}$,

$$C_i \equiv (\vec{A} \times \vec{B})_i = \sum_{j,k} \epsilon_{ijk} A_j B_k \tag{1.66}$$