



Definition

Suppose U_1, \dots, U_m are subspaces of a vector space V . The sum $M = U_1 + \dots + U_m$ is called a *direct sum* if each element $x \in M$ can only be written in one way as a sum

$$x = u_1 + \dots + u_m$$

for $u_i \in U_i$, $i = 1, \dots, m$. We call the sum *direct*. Conversely, we call U_1, \dots, U_m a *decomposition* of M .

Notation

If M is a direct sum of U_1, \dots, U_m , we use the notation \oplus . We write

$$M = U_1 \oplus \dots \oplus U_m$$

