LINEAR COMBINATION

A vector $\vec{r}$ is said to be a linear combination of the vectors $\vec{a}, \vec{b}, \vec{c}$,

if there exist Scalars x, y, z such that $\vec{r} = x\vec{a} + y\vec{b} + z\vec{c}$

Thus the vectors $2\vec{a} - \vec{b} + 3\vec{c}, \vec{a} - 2\vec{b} + 4\vec{c}$ are linear combinations of the vectors $\vec{a}, \vec{b}$ and $\vec{c}$.

A linear combination of vectors, involves the two linear compositions of the addition of vectors and the multiplication of vectors by scalars.

If two vectors have same or parallel supports, then each is a linear combination of the other. Thus if $\vec{a}$ and $\vec{b}$ are two parallel vectors, the

n there exist a. nonzero scalar x such that $\vec{b} = x\vec{a}$ or $\vec{a} = \frac{1}{x}\vec{b}$

The vectors $\vec{a}, \vec{b}, \vec{c}$ are called linearly independent or linearly dependent according as

$$x\vec{a} + y\vec{b} + z\vec{c} = \vec{0}$$

implies $x = y = z = 0$ or there exist at least one pair of x, y, z in which at least one x, y, z is not zero.