

Answer on Question #48916 - Physics – Other

Can a vector with zero magnitude have one or more components that are nonzero?

Solution:

No. It may be the vector sum of 2 or more non-zero vectors, but the magnitude of a vector \vec{v} with components $v_x, v_y, v_z \dots v_w$ is given by

$$|\vec{v}| = \sqrt{v_x^2 + v_y^2 + v_z^2 + \dots + v_w^2}$$

so for $|\vec{v}|$ to be 0, all of the $v_x, v_y, v_z \dots v_w$ terms must be 0.