21-S-2-5-AG-051

A force is defined by $\boldsymbol{A} = \{X\hat{\boldsymbol{\imath}} + Y\hat{\boldsymbol{\jmath}} + Z\hat{\boldsymbol{k}}\}\, N$. What is the magnitude of the vector? What are the coordinate direction angles?

ANSWER:

The magnitude of the vector is defined by the following equation.

$$A = \sqrt{X^2 + Y^2 + Z^2}$$

We know that:

$$\boldsymbol{A} = A\hat{\boldsymbol{u}} = A\cos(\alpha)\,\hat{\boldsymbol{\imath}} + A\cos(\beta)\,\hat{\boldsymbol{\jmath}} + A\cos(\gamma)\,\hat{\boldsymbol{k}} = X\hat{\boldsymbol{\imath}} + Y\hat{\boldsymbol{\jmath}} + Z\hat{\boldsymbol{k}}$$

Therefore,

$$\alpha = \cos^{-1}\left(\frac{X}{A}\right)$$

$$\beta = \cos^{-1}\left(\frac{Y}{A}\right)$$

$$\gamma = \cos^{-1}\left(\frac{Z}{A}\right)$$