

2.2.11

AI25BTECH11019 - MENAVATH SAI SANJANA

Question:

The plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(\alpha)$ with the x-axis. The value of α is equal to

Solution:

Let the normal vector of the plane be $\vec{n} = 2\hat{i} - 3\hat{j} + 6\hat{k}$.

The x-axis has direction vector $\vec{a} = \hat{i}$.

The cosine of the angle θ between the normal and x-axis: $\cos \theta = \frac{\vec{n} \cdot \vec{a}}{|\vec{n}| |\vec{a}|}$
 $= \frac{2}{\sqrt{2^2 + (-3)^2 + 6^2}} = \frac{2}{7}$ Angle between plane and x-axis $= 90^\circ - \theta$.

Thus, $\alpha = \sin(90^\circ - \theta) = \cos \theta = \frac{2}{7}$ So, the value of α is $2/7$.

Plane $2x - 3y + 6z - 11 = 0$, x-axis, a vector in the plane and the normal
 (arc shows angle between x-axis and the plane)

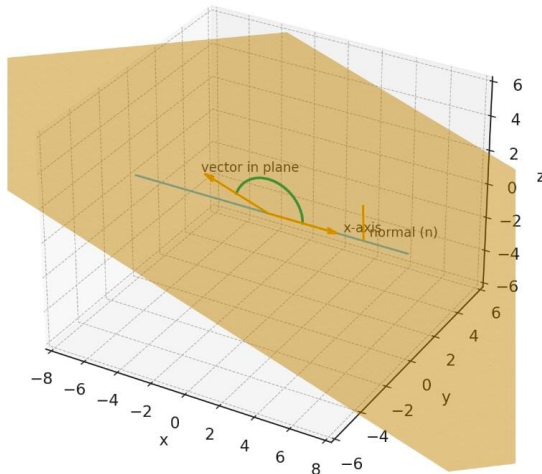


Fig. 0.1