2.2.30

AI25BTECH11037-stalin

Question:
Find the angle between the line

$$\frac{x+1}{2} = \frac{y}{3} = \frac{z-3}{6} \tag{0.1}$$

and the plane

$$10x + 2y - 11z = 3. \tag{0.2}$$

.
Solution:
Let us solve the given equation theoretically and then verify the solution computationally
According to the question,
Given a plane and line
Let θ be angle between plane and line
Then $90° - \theta$ is angle between normal vector of plane and line
Let **D** be dirction vector of line and **n** be normal of plane

$$\mathbf{D} = \begin{pmatrix} 2 \\ 3 \\ 6 \end{pmatrix} \quad \mathbf{n} = \begin{pmatrix} 10 \\ 2 \\ -11 \end{pmatrix} \tag{0.3}$$

$$\cos(90° - \theta) = \frac{\mathbf{D}^T \mathbf{n}}{\|\mathbf{n}\|\|\mathbf{D}\|} = \frac{-8}{21} \tag{0.4}$$

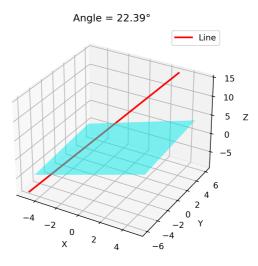$$\theta = 90° - \cos^{-1}(\frac{-8}{21}) = -22.39° \tag{0.5}$$

angle is $22.39°$

Fig. 0.1