1-1.4-91

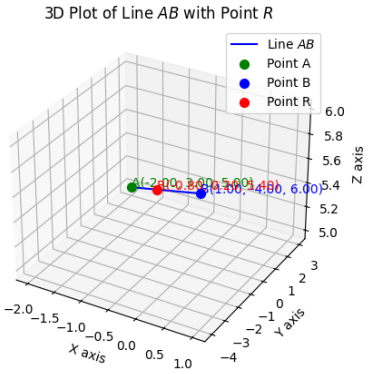
AI24BTECH11028- Ronit Ranjan

Question:
Find the coordinates of the point which divides the line segement joining the points (-2, 3, 5) and (1, -4, 6) in the ratio
i) 2:3 internally
ii) 2:3 externally

Solution: For internal divison we have,

$$D = \frac{kC + B}{k + 1} \tag{0.1}$$

Here $C = (1, -4, 6)$, $B = (-2, 3, 5)$ and $k = \frac{2}{3}$
Now, Putting values in the equation we get,



$$D = \frac{\frac{2}{3}\begin{pmatrix}1\\-4\\6\end{pmatrix} + \begin{pmatrix}-2\\3\\5\end{pmatrix}}{\frac{2}{3}+1} \tag{0.2}$$

$$D = \frac{\begin{pmatrix}\frac{-4}{3}\\\frac{1}{3}\\9\end{pmatrix}}{\frac{5}{3}} \tag{0.3}$$

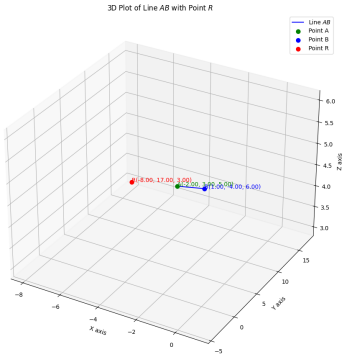
$$D = \begin{pmatrix}\frac{-4}{5}\\\frac{1}{5}\\\frac{27}{5}\end{pmatrix} \tag{0.4}$$

So, the point which divides the line segement joining the points $(2, 3, 5)$ and $(1, -4, 6)$ is $\left(\frac{-4}{5}, \frac{1}{5}, \frac{27}{5}\right)$

For external divison we have,

$$D = \frac{kC - B}{k - 1} \tag{0.5}$$

Now, Putting values in the equation we get,



$$D = \frac{\frac{2}{3}\begin{pmatrix}1\\-4\\6\end{pmatrix} - \begin{pmatrix}-2\\3\\5\end{pmatrix}}{\frac{2}{3}-1} \tag{0.6}$$

$$D = \frac{\begin{pmatrix}\frac{8}{3}\\\frac{-35}{3}\\-1\end{pmatrix}}{\frac{-1}{3}} \tag{0.7}$$

$$D = \begin{pmatrix}-8\\17\\3\end{pmatrix} \tag{0.8}$$

So, the point which divides the line segement joining the points $(2, 3, 5)$ and $(1, -4, 6)$ is $(-8, 17, 3)$