4.3.8

EE25BTECH11023 - Venkata Sai

Question:
The vector equation of the line

$$\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2} \tag{1}$$

is

Solution: A point on the line is given as

$$\begin{pmatrix} x-5 \\ y+4 \\ z-6 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \tag{2}$$

$$\mathbf{a} = \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} \tag{3}$$

The direction vectors of given line are

$$\mathbf{b} = \begin{pmatrix} 3 \\ 7 \\ 2 \end{pmatrix} \tag{4}$$

The vector equation of a line is given as

$$\mathbf{r} = \mathbf{a} + t\mathbf{b} \tag{5}$$

$$\mathbf{r} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} + t \begin{pmatrix} 3 \\ 7 \\ 2 \end{pmatrix} \tag{6}$$

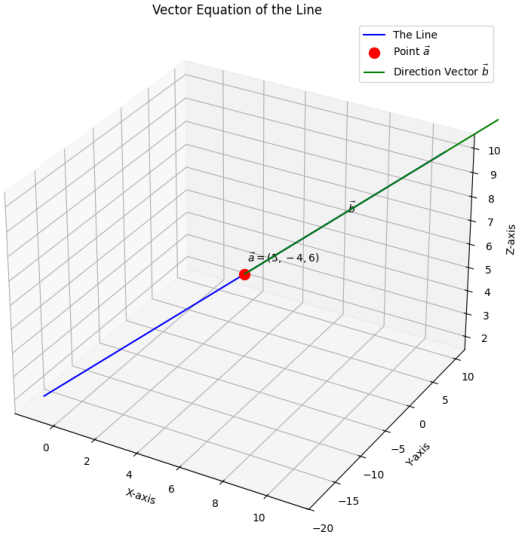
Vector Equation of the Line
The Line
Point $\vec{a}$
Direction Vector $\vec{b}$
$\vec{a} = (5, -4, 6)$
$\vec{b}$
X-axis
Y-axis
Z-axis

Fig. 0.1