4.4.9

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Question:
The vector equation of the line

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

is _____.

Solution:

Term	Description
A	Position vector of point A
m	Direction vector of the given line

TABLE 1: Terms used

The given line pass through the point A and the position vector of this point is **A**,

$$\mathbf{A} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} \tag{0.1}$$

The direction vector of the given line is **m**,

$$\mathbf{m} = \begin{pmatrix} 6 \\ 14 \\ 4 \end{pmatrix} \tag{0.2}$$

From equation (**??**), the vector equation of line is passing through A whose position vector is **A** and having direction vector **m** given by,

$$\mathbf{x} = \mathbf{A} + \kappa\mathbf{m} \tag{0.3}$$

$\therefore$ the vector equation of the given line is,

$$\mathbf{x} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} + \kappa \begin{pmatrix} 6 \\ 14 \\ 4 \end{pmatrix}$$

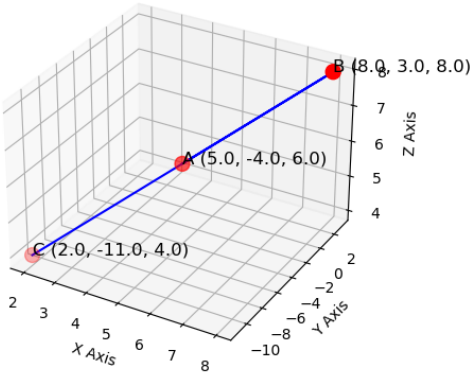

Fig. 0.1: Plot showing the given line