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	Point A
B	Point B
C	Point C
m	Direction vector of the given line

TABLE 1: Terms used

The given line is passing through:

$$\mathbf{A} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 8 \\ 3 \\ 8 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 2 \\ -11 \\ 4 \end{pmatrix}$$

From equation (**??**) ,the direction vector of the line is

$$\mathbf{m} = \mathbf{B} - \mathbf{C} = \begin{pmatrix} 6 \\ 14 \\ 4 \end{pmatrix} \tag{0.1}$$

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

$$\mathbf{x} = \mathbf{A} + \kappa\mathbf{m} \tag{0.2}$$

from equation 0.2, the vector equation of the given line is,

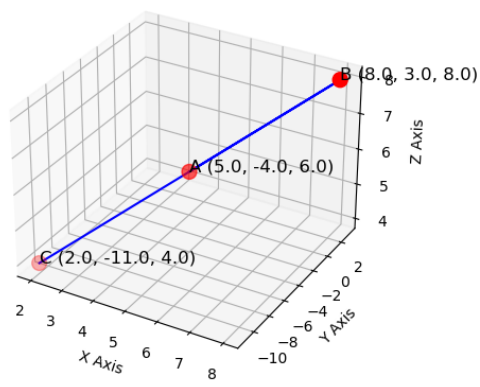$$\mathbf{x} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} + \kappa \begin{pmatrix} 6 \\ 14 \\ 4 \end{pmatrix}$$

Fig. 0.1: Plot showing the given line