

# 9.5.3

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## Question:

The cartesian equation of a line  $AB$  is  $\frac{2x-1}{12} = \frac{y+2}{2} = \frac{z-3}{3}$ . Find the direction cosines of a line parallel to line  $AB$ .

## Solution:

Term	Description
$m$	Direction vector of line

TABLE 1: Terms used

The direction vector of the given line is:

$$\mathbf{m} = \begin{pmatrix} 12 \\ 2 \\ 3 \end{pmatrix}$$

The unit vector of a line having direction vector  $m$  is given by :

$$\frac{m}{\|m\|} \quad (0.1)$$

The direction cosines are elements of above vector

From 0.1 the unit vector along  $AB$  is:

$$\frac{1}{\sqrt{157}} \begin{pmatrix} 12 \\ 2 \\ 3 \end{pmatrix} \quad (0.2)$$

$\therefore$  the direction cosines of line parallel to line  $AB$  are the elements of above vector.

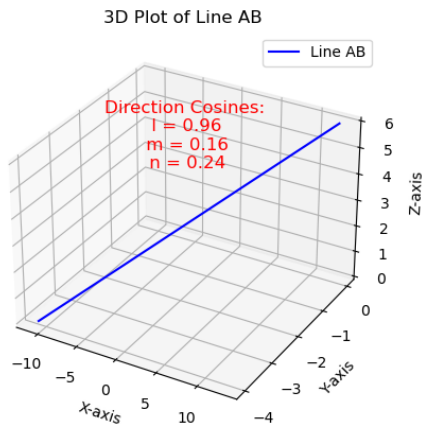


Fig. 0.1: Plot showing the line  $AB$