## EE25BTECH11023 - Venkata Sai

## **Question:**

Find the equation of the line passing through the point (1, -3, 2) and parallel to the line

$$\mathbf{r} = (2+\lambda)\hat{i} + \lambda\hat{j} + (2\lambda - 1)\hat{k} \tag{1}$$

**Solution:** Given line is

$$\mathbf{r} = \begin{pmatrix} 2+\lambda \\ \lambda \\ 2\lambda - 1 \end{pmatrix} \quad \mathbf{a} = \begin{pmatrix} 1 \\ -3 \\ 2 \end{pmatrix} \tag{2}$$

The vector equation of given line is given by

$$\mathbf{r} = \begin{pmatrix} 2 \\ 0 \\ -1 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \tag{3}$$

The direction vectors of given line are

$$\mathbf{m} = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \tag{4}$$

The lines with direction vectors  $\mathbf{m}$  and  $\mathbf{n}$  are parallel if

$$\mathbf{m} = \mathbf{n} \implies \mathbf{n} = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \tag{5}$$

The equation of a line is given by

$$\mathbf{r} = \mathbf{a} + t\mathbf{n} \tag{6}$$

$$\mathbf{r} = \begin{pmatrix} 1 \\ -3 \\ 2 \end{pmatrix} + t \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \tag{7}$$

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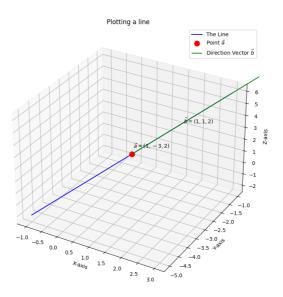


Fig. 0.1