Three Dimensional Geometry

1 12^{th} Maths - Chapter 11

This is Problem 5 from Exercise-11.2

1. Find the equation of the line in vector and in cartesian form that passes through the point with position vector $2\hat{i} - \hat{j} + 4\hat{k}$ and is in direction $\hat{i} + 2\hat{j} - \hat{k}$.

   Solution: Let

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

   Vector equation of a line is,

$$\mathbf{r} = \mathbf{A} + \lambda\mathbf{m} \tag{2}$$

$$\mathbf{r} = \begin{pmatrix} 2 \\ -1 \\ 4 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix} \tag{3}$$

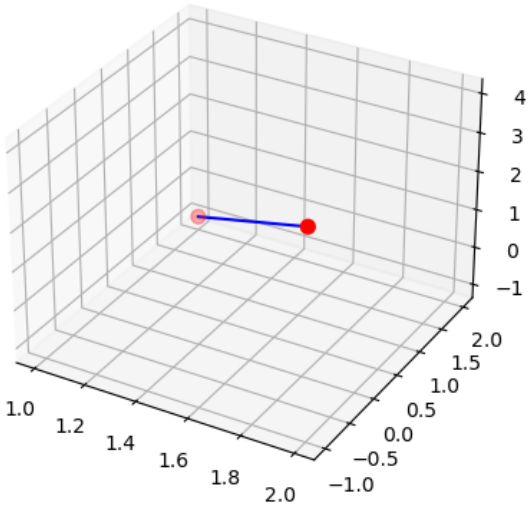

Figure 1