Assignment 2

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Abstract—This document solves a problem based on the given point and a parallel vector.

1 PROBLEM

Find the equation of a line which passes through $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ and is parallel to vector $\begin{pmatrix} 3 \\ 2 \\ -2 \end{pmatrix}$.

2 EXPLANATION

A constant multiple of a vector points in the same direction and Hence it's convenient to find the line taking $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ as the starting point and following it with a constant multiple of the line parallel to the desired line.
Hence,
Equation of a line with a point with position vector **a** and parallel to position vector **b** will come to be:

$$\mathbf{r} = \mathbf{a} + k\mathbf{b} \tag{2.0.1}$$

3 SOLUTION

As explained in the previous section. Vectors will be as follows:

$$\mathbf{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \tag{3.0.1}$$

$$\mathbf{b} = \begin{pmatrix} 3 \\ 2 \\ -2 \end{pmatrix} \tag{3.0.2}$$

Equation of the desired line in vector form will be:–

Using Equation 2.0.1

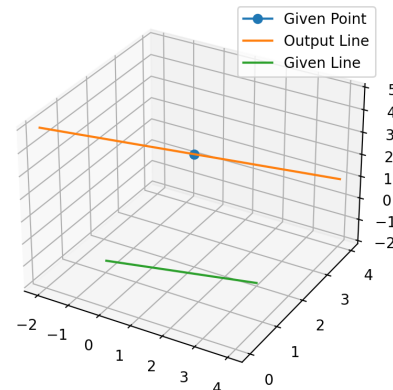$$\mathbf{r} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + k \begin{pmatrix} 3 \\ 2 \\ -2 \end{pmatrix} \tag{3.0.3}$$

Fig. 0: Figure depicting provided as well as resultant data