

Assignment 2

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

Download all python codes from

<https://github.com/Adarsh1310/EE5609/tree/master/codes>

and latex-tikz codes from

<https://github.com/Adarsh1310/EE5609>

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

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

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 \mathbf{a} and parallel to position vector \mathbf{b} will come to be:

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

3 SOLUTION

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

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

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

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