# Assignment 2

Adarsh Srivastava

***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

## 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:

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

## 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:–

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

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