

Matrix Theory (EE5609) Assignment 2

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Abstract—This assignment finds the equation of a straight line given two points on that line.

1 PROBLEM STATEMENT

Find the equation of the line passing through the origin and the point $\begin{pmatrix} 5 \\ -2 \\ 3 \end{pmatrix}$.

2 SOLUTION

Let the points be $\mathbf{O} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$ which is the origin and

$$\mathbf{P} = \begin{pmatrix} 5 \\ -2 \\ 3 \end{pmatrix}.$$

The vector form of the line passing through \mathbf{O} and \mathbf{P} , which is the line passing through the point \mathbf{O} and along direction vector \mathbf{A} is given by

$$\mathbf{r} = \mathbf{a} + k\mathbf{b} \quad (2.0.1)$$

$$\Rightarrow \mathbf{r} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} + k \begin{pmatrix} 5 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.2)$$

$$\Rightarrow \mathbf{r} = k \begin{pmatrix} 5 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.3)$$

where k is a constant multiple.

Python Code: The code for generating the Figure 1 can be found at https://github.com/Arko98/EE5609/blob/master/Assignment_2/Codes/Figure.py

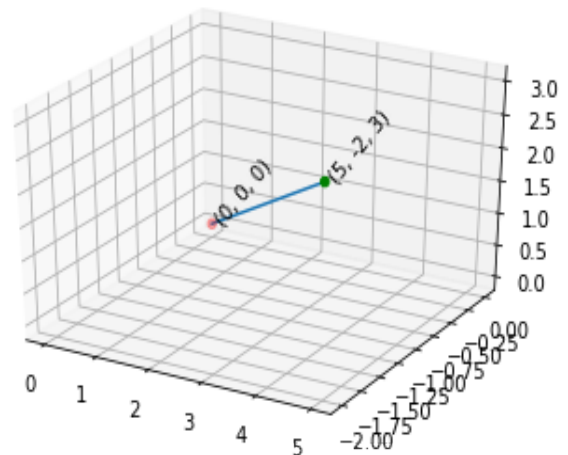


Fig. 1: Line passing through origin and point (5,-2,3)