

Matrix theory Assignment 2

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Abstract—This document contains the solution to a variable k in a set of linear equations

Download all python codes from

<https://github.com/saipranavkr/EE5609/codes>

and latex-tikz codes from

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

1 PROBLEM

Find the equation of the line given by

$$\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$$

2 SOLUTION

Let,

$$\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2} = t \quad (2.0.1)$$

Equation of the line from the above (2.0.1) can be expressed as,

$$\Rightarrow \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 3t+5 \\ 7t-4 \\ 2t+6 \end{pmatrix} \quad (2.0.2)$$

It can be further written as,

$$\Rightarrow \mathbf{x} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} + t \begin{pmatrix} 3 \\ 7 \\ 2 \end{pmatrix} \quad (2.0.3)$$

where,

$$\mathbf{x} = \begin{pmatrix} x \\ y \\ z \end{pmatrix} \quad (2.0.4)$$

Hence, equation 2.0.3 gives the equation of a line

and for $t=0$, the line passes through the point $\begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix}$

Plot of the line which passes through the point when $t=0$ is given below.

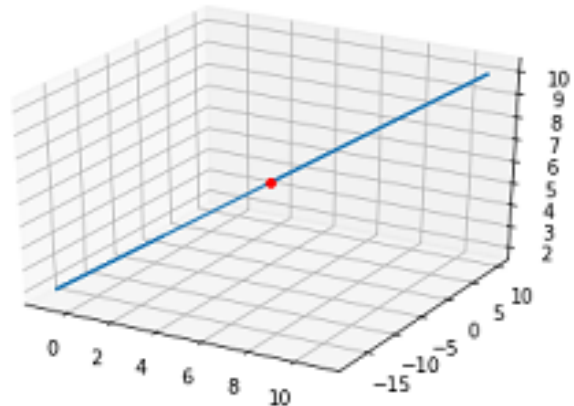


Fig. 0: Line passing through point (5,-4,6)