Matrix theory Assignment 2

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***Abstract*—This document gives the equaltion of a line in parametric form**

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,

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

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

$$\implies \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 3t+5 \\ 7t-4 \\ 2t+6 \end{pmatrix} \tag{2.0.2}$$

It can be further written as,

$$\implies \mathbf{x} = \begin{pmatrix} 5 \\ -4 \\ 6 \end{pmatrix} + t \begin{pmatrix} 3 \\ 7 \\ 2 \end{pmatrix} \tag{2.0.3}$$

where,

$$\mathbf{x} = \begin{pmatrix} x \\ y \\ z \end{pmatrix} \tag{2.0.4}$$

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.

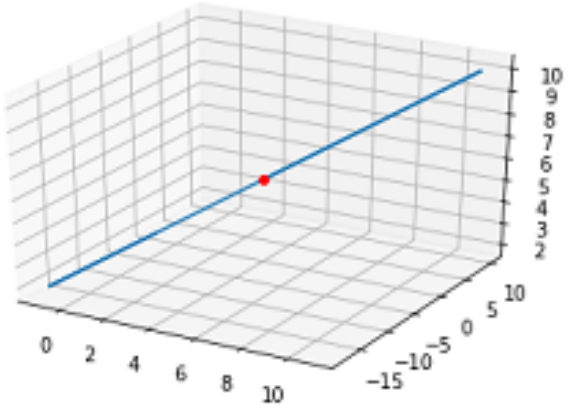

Fig. 0: Line passing through point (5,-4,6)