

Assignment 4

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Download all python codes from

<https://github.com/ooharapolu/ASSIGNMENT 4/Assignment4.py>

and latex-tikz codes from

<https://github.com/ooharapolu/ASSIGNMENT 4/main.tex>

Let,

$$\mathbf{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad (2.0.6)$$

Hence it's equation is obtained as

$$\mathbf{r} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} -3 \\ 5 \\ 4 \end{pmatrix} \quad (2.0.7)$$

1 QUESTION No.2.57

Find the vector equation of the line passing through

$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ and parallel to the planes

$$(1 \ -1 \ 2)\mathbf{x} = 5 \quad (1.0.1)$$

$$(3 \ 1 \ 1)\mathbf{x} = 6 \quad (1.0.2)$$

2 SOLUTION:

The normal vector to the desired plane is perpendicular the normal vectors of both the given planes. Thus

$$\mathbf{n} = \mathbf{n}_1 \times \mathbf{n}_2 \quad (2.0.1)$$

Here,

$$\mathbf{n}_1 = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}, \mathbf{n}_2 = \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix} \quad (2.0.2)$$

So,

$$\mathbf{n} = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix} \times \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix} \quad (2.0.3)$$

$$= \begin{pmatrix} -3 \\ 5 \\ 4 \end{pmatrix} \quad (2.0.4)$$

The equation of the line is

$$\mathbf{r} = \mathbf{a} + \lambda \mathbf{n} \quad (2.0.5)$$

PLOT OF GIVEN LINES -

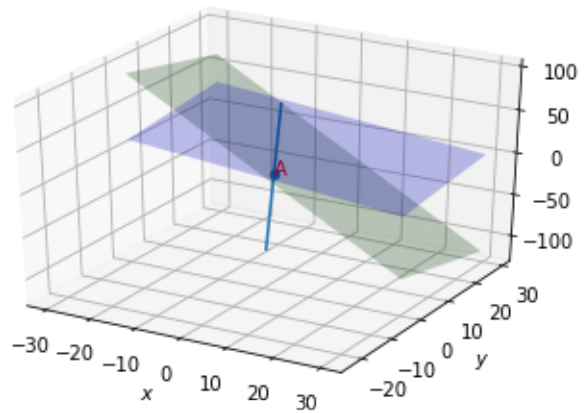


Fig. 0: The two planes of the parallel line