# Assignment 4

## R.OOHA

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

### 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

$$(1 -1 2)\mathbf{x} = 5$$
 (1.0.1)  
 $(3 1 1)\mathbf{x} = 6$  (1.0.2)

#### 2 SOLUTION:

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

$$\mathbf{n} = \mathbf{n}_1 \times \mathbf{n}_2 \tag{2.0.1}$$

Here,

$$\mathbf{n_1} = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}, \mathbf{n_2} = \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix} \tag{2.0.2}$$

So,

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

$$= \begin{pmatrix} -3\\5\\4 \end{pmatrix} \tag{2.0.4}$$

The equation of the line is

$$\mathbf{r} = \mathbf{a} + \lambda \mathbf{n} \tag{2.0.5}$$

Let,

$$\mathbf{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \tag{2.0.6}$$

Hence it's equation is obtained as

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

PLOT OF GIVEN LINES -

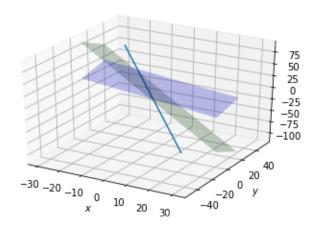


Fig. 0: The two planes of the parallel line