

# 4.5.12

EE25BTECH11010 - Arsh Dhoke

## Question:

Find the equation of the plane passing through  $(a, b, c)$  and parallel to the plane  $\mathbf{r} \cdot (\mathbf{i} + \mathbf{j} + \mathbf{k}) = 2$ .

## Solution:

Description	Vector
Normal to plane( $\mathbf{n}$ )	$\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$
Point on plane( $\mathbf{P}$ )	$\begin{pmatrix} a \\ b \\ c \end{pmatrix}$

Given plane:

$$\mathbf{n}^T \mathbf{x} = 2 \quad (0.1)$$

Required plane which is parallel to given plane:

$$\mathbf{n}^T \mathbf{x} = d \quad (0.2)$$

To find  $d$  substitute given point in required plane equation:

$$\begin{pmatrix} 1 & 1 & 1 \end{pmatrix} \cdot \begin{pmatrix} a \\ b \\ c \end{pmatrix} = d \quad (0.3)$$

Thus,

$$d = a + b + c \quad (0.4)$$

$$\boxed{\mathbf{n}^T \mathbf{x} = a + b + c}$$

This can also be written in the form:  $\boxed{\mathbf{r} \cdot \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = a + b + c}$

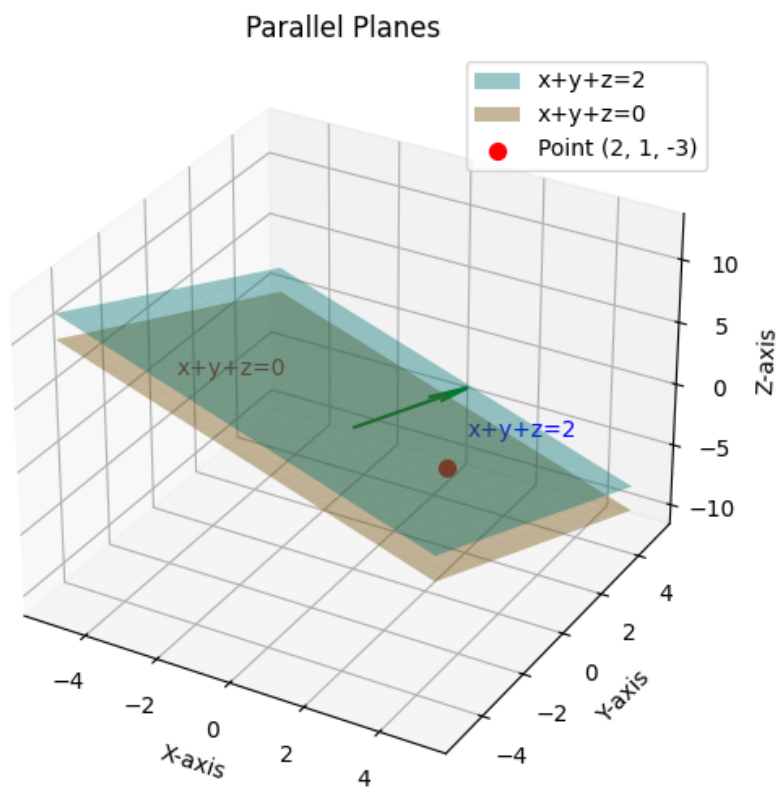


Fig. 0.1: Graph