

# Assignment 1

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Download all python codes and latex codes from

<https://github.com/sourav-sarkar/Assignments/tree/master/assignment1>

Putting  $\lambda = -\frac{1}{2}$  in equation 2.0.1,

$$-\frac{1}{2}y + \frac{3}{2}z = 3$$

## 1 PROBLEM

Find the equation of the plane passing through the line of intersection of the planes  $(1, 1, 1)x = 1$  and  $(2, 3, -1)x = -4$  and parallel to the x-axis.

## 2 EXPLANATION

We can write plane  $(1, 1, 1)x = 1$  as  $x + y + z = 1$  and  $(2, 3, -1)x = -4$  as  $2x + 3y - z = -4$

From the first equation:  $z = 1 - x - y$

From the second equation:  $z = 2x + 3y + 4$

So,

$$1 - x - y = 2x + 3y + 4 \text{ or } y = -\frac{3x+3}{4}$$

Putting y's value in  $z = 1 - x - y$  we get  $z = \frac{7-x}{4}$

We can generalize the intersection line as  $x = t, y = -\frac{3t+3}{4}, z = \frac{7-t}{4}$

The equation of the plane passing through the line of intersection of the above two planes can be written as:

$$(1 + 2\lambda)x + (1 + 3\lambda)y + (1 - \lambda) = (1 - 4\lambda) \quad (2.0.1)$$

Now, according to the problem statement the plane is parallel to the X-axis.

So, the equation should be like

$$by + cz = d$$

Hence,

$$(1 - 2\lambda) = 0$$

$$\lambda = -\frac{1}{2}$$

## 3 RESULT

Plot of plane obtained from Python code is shown below. Here the final plane (red color) passing through the line of intersection of the planes  $(1, 1, 1)x = 1$  (green color) and  $(2, 3, -1)x = -4$  (blue color) and which actually is parallel to the X-axis.

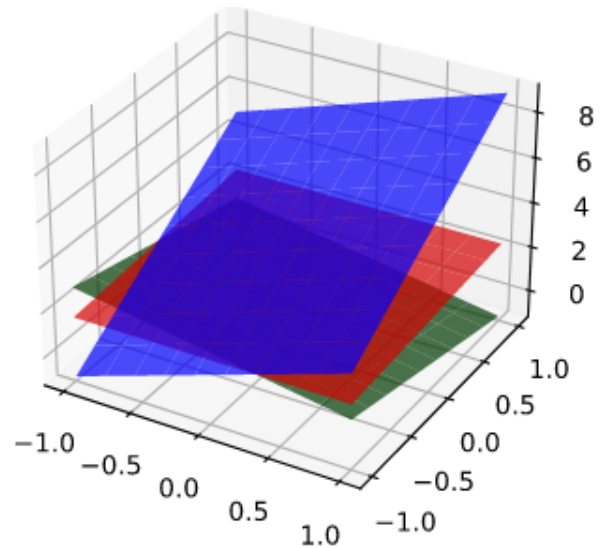


Fig. 0: Plot of the planes