Assignment 1

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Download all python codes from

https://github.com/sourav−sarkar/Assignments/blob/master/assignment1/AI_assignment1.ipynb

and latex codes from

https://github.com/sourav−sarkar/Assignments/blob/master/assignment1/AI_assignment1.tex

1 Problem

Find the equation of the plane passing through the line of intersection of the planes $\begin{pmatrix}1,1,1\end{pmatrix}$x = 1 and $\begin{pmatrix}2,3,-1\end{pmatrix}$x = -4 and parallel to the x-axis.

2 Explanation

We can write plane $\begin{pmatrix}1,1,1\end{pmatrix}$x = 1 as $x + y + z = 1$ and $\begin{pmatrix}2,3,-1\end{pmatrix}$x = -4 as 2x+3y-z= -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,

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

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

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

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

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 $\begin{pmatrix}1,1,1\end{pmatrix}$x = 1 (green color) and $\begin{pmatrix}2,3,-1\end{pmatrix}$x = -4 (blue color) and which actually is parallel to the X-axis.

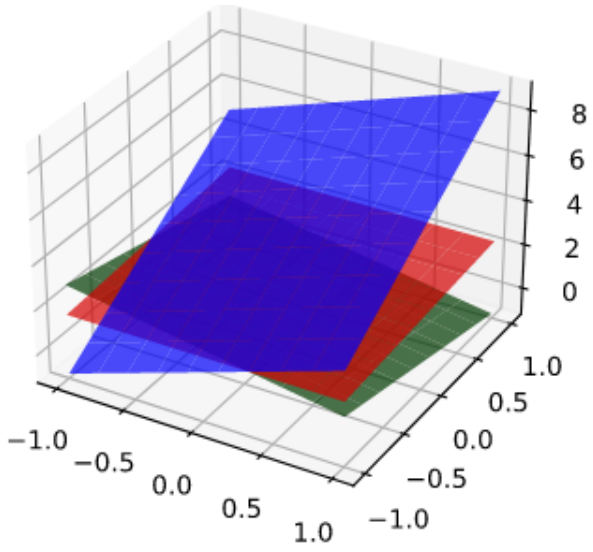

Fig. 0: Plot of the planes