4.6.1

EE25BTECH11013 - Bhargav

Question:
The distance between the parallel planes

$$2x + y - 2z - 6 = 0 \tag{0.1}$$

$$4x + 2y - 4z = 0 \tag{0.2}$$

Solution:

The 2 given planes are parallel since their normal vectors are the same

The normal vector of the planes $\mathbf{n}$

$$\mathbf{n} = \begin{pmatrix} 2 \\ 1 \\ -2 \end{pmatrix} \tag{0.3}$$

The distance between the planes is given by this formula

$$\text{Distance} = \frac{|d_1 - d_2|}{\|\mathbf{n}\|} \tag{0.4}$$

Where $d_1 = 6$ and $d_2 = 0$

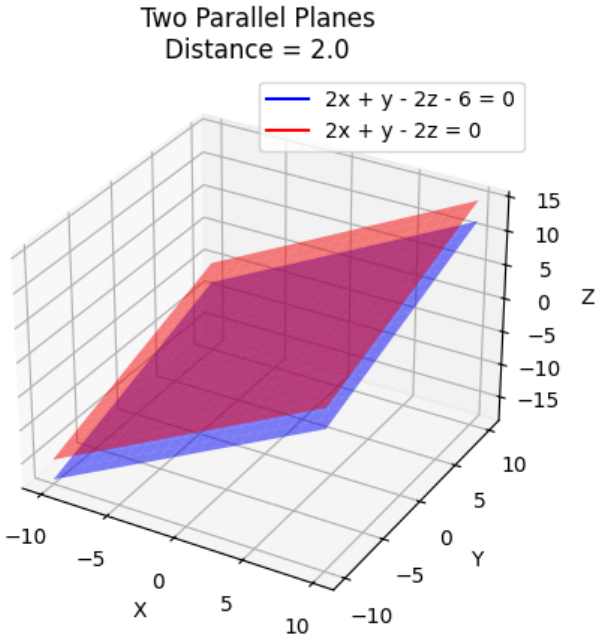
$$\|\mathbf{n}\| = \left(\sqrt{(2)^2 + (1)^2 + (-2)^2} \right) = 3 \tag{0.5}$$

Substituting these values in the distance formula, we get

$$\therefore \text{Distance} = \frac{|6 - 0|}{3} \tag{0.6}$$

$$\text{Distance} = 2 \tag{0.7}$$

Therefore, the distance between the planes is 2


Two Parallel Planes
Distance = 2.0
2x + y - 2z - 6 = 0
2x + y - 2z = 0
15
10
5
0
−5
−10
−15
Z
10
5
0
−5
−10
Y
−10
−5
0
5
10
X