## EE25btech11028 - J.Navya sri

## **Question:**

Find the equation of the plane through the points

$$(2,1,0), (3,-2,-2), (3,1,7).$$

**Solution:** Given three points:

$$P_1(2,1,0), P_2(3,-2,-2), P_3(3,1,7)$$

The direction vectors are:

$$(v)_1 = (P_2 - P_1) = (3 - 2, -2 - 1, -2 - 0) = (1, -3, -2)$$
 (1)

$$(v)_2 = (P_3 - P_1) = (3 - 2, 1 - 1, 7 - 0) = (1, 0, 7)$$
 (2)

The normal vector to the plane is given by the cross product:

$$(n) = (v)_1 \times (v)_2 \tag{3}$$

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$$\begin{pmatrix} n \end{pmatrix} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ 1 & -3 & -2 \\ 1 & 0 & 7 \end{vmatrix} \tag{4}$$

$$(n) = (-21, -9, 3) = (-7, -3, 1)$$
 (5)

Hence, the equation of the plane is:

$$-7(x-2) - 3(y-1) + (z-0) = 0 (6)$$

Simplifying:

$$-7x + 14 - 3y + 3 + z = 0 (7)$$

$$7x + 3y - z - 17 = 0 ag{8}$$

Final answer:

$$7x + 3y - z - 17 = 0$$

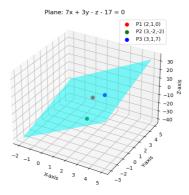


Fig. 1