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Lecture notes- 18

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B.C.A I year (II Sem)

Subject - Mathematics - II

Topic - Equation of plane (Unit-5)

Imp

Exp 20 Find the equation of plane through (1,2,3) parallel to the plane $3x+4y-5z=0$

Solution Let the equation of parallel to the given plane $3x+4y-5z=0$ is

$$3x+4y-5z=k$$

If it passes through (1,2,3) then

$$\Rightarrow 3(1)+4(2)-5(3)=k$$

$$\Rightarrow k=-4$$

\therefore The equation of plane is

$$3x+4y-5z=-4$$

$$\Rightarrow 3x+4y-5z+4=0 \quad \underline{\text{Ans}}$$

Ques Find the distance between the parallel planes $2x-2y+z+3=0$ and $4x-4y+2z+7=0$

Do itself

* Perpendicular distance of a point (x_1, y_1, z_1) to a given plane $ax+by+cz+d=0$ is

$$p = \frac{ax_1 + by_1 + cz_1 + d}{\sqrt{a^2 + b^2 + c^2}}$$

* To find the distance between two parallel planes \rightarrow

Find the length of perpendicular distance of each plane from the origin. Then the difference of these two perpendicular distance is the distance between two planes.

* Condition for a line to be parallel and perpendicular to a plane \rightarrow

Let $ax+by+cz+d=0$ is the equation of plane.

(i) The line parallel to the plane is $al + bm + cn = 0$

(ii) The line perpendicular to the plane is $\frac{a}{l} = \frac{b}{m} = \frac{c}{n}$

* To find the angle between the planes \rightarrow

If θ is the angle between the planes

Then

$$\tan \theta = \frac{2\sqrt{f^2 + g^2 + h^2 - bc - ca - ab}}{a + b + c}$$

NOTE Two planes are perpendicular if
 $a + b + c = 0$

* Area of Triangle \rightarrow To find area of
 ΔABC whose co-ordinates
 are $A(x_1, y_1, z_1)$, $B(x_2, y_2, z_2)$, $C(x_3, y_3, z_3)$

$$\Delta^2 = \Delta_x^2 + \Delta_y^2 + \Delta_z^2$$

$$\text{Where } \Delta_x = \frac{1}{2} \begin{vmatrix} y_1 & z_1 & 1 \\ y_2 & z_2 & 1 \\ y_3 & z_3 & 1 \end{vmatrix}$$

$$\Delta_y = \frac{1}{2} \begin{vmatrix} x_1 & z_1 & 1 \\ x_2 & z_2 & 1 \\ x_3 & z_3 & 1 \end{vmatrix}$$

$$\Delta_z = \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$