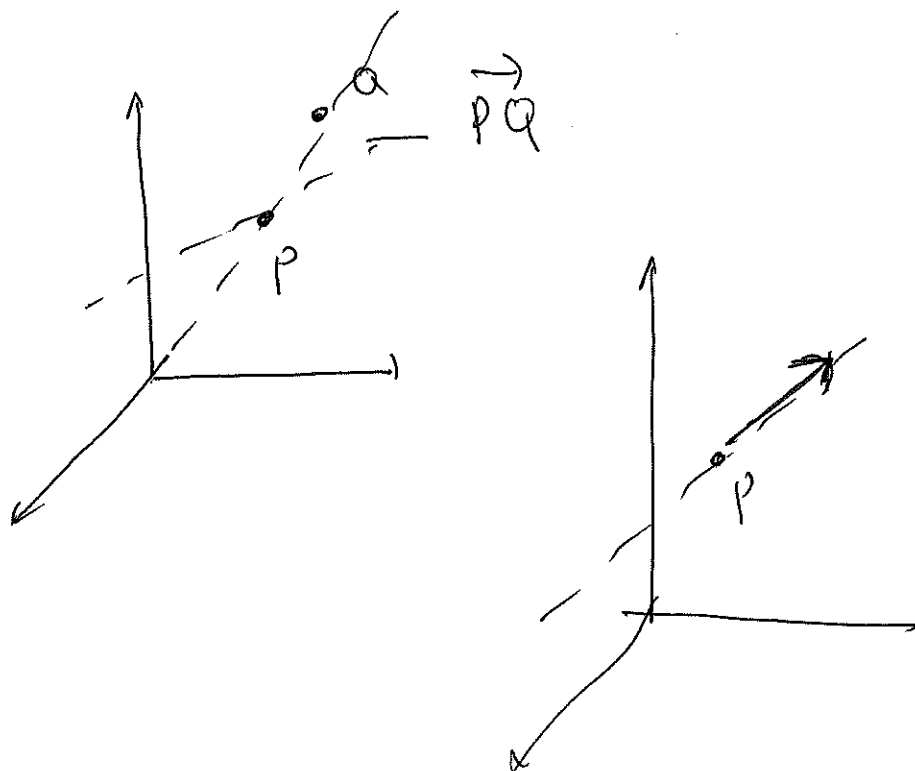


1/18/2019 (1)



Parametric Eq'n of A Line

$$P = P(1, 2, -1)$$

$$Q = Q(2, 3, 4)$$

#1 $P_0 = P(1, 2, -1)$

$$\vec{PQ} = \langle \underline{1}, 1, 5 \rangle = \vec{v} = \langle a, b, c \rangle$$

$$x(t) = 1 + 1t$$

$$y(t) = 2 + 1t$$

$$z(t) = -1 + 5t$$

1/18/2019 (2)

$$p_0 = (1, 2, 3) = (x_0, y_0, z_0)$$

$$\vec{v} = \langle 2, -3, 4 \rangle = \langle a, b, c \rangle$$

$$x(t) = x_0 + at$$

$$y(t) = y_0 + bt$$

$$z(t) = z_0 + ct$$

$$x(t) = 1 + 2t$$

$$y(t) = 2 + -3t$$

$$z(t) = 3 + 4t$$

$$x(t) = x_0 + at$$

$$y(t) = y_0 + bt$$

$$z(t) = z_0 + ct$$

$$x - x_0 = at$$

$$y - y_0 = bt$$

$$z - z_0 = ct$$

$$\Rightarrow \frac{x - x_0}{a} = t$$

$$\frac{y - y_0}{b} = t$$

$$\frac{z - z_0}{c} = t$$

1/18/2019 (3)

$$P = (0, 0, 0)$$

$$(0, 0, 0) = (x_0, y_0, z_0)$$

$$Q = (4, 3, -1)$$

$$\vec{PQ} = \langle 4, 3, -1 \rangle = \langle a, b, c \rangle$$

Parametric:

$$x(t) = 0 + 4t$$

$$y(t) = 0 + 3t$$

$$z(t) = 0 + -t$$

Symmetric

$$\text{Pattern: } \frac{x-x_0}{a} = \frac{y-y_0}{b} = \frac{z-z_0}{c}$$

$$\frac{x}{4} = \frac{y}{3} = \frac{z}{-1}$$

1/18/19 (4)

Line thru $(2, 1, 0)$

in a direction $\perp$ to $\hat{i} + \hat{j}$ and $\hat{j} + \hat{k}$
 $\parallel \vec{a}$ $\parallel \vec{b}$

$$\vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 0 \\ 0 & 1 & 1 \end{vmatrix}$$

$$= \hat{i} \cdot 1 - 1 \cdot \hat{j} + 1 \hat{k}$$

$$= \hat{i} - \hat{j} + \hat{k}$$

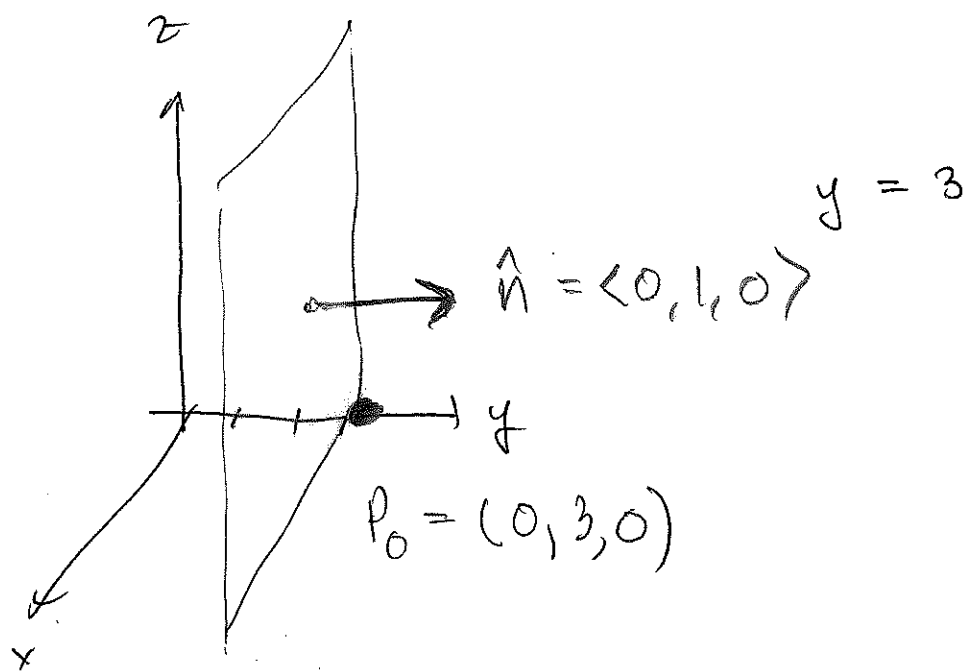
$$= \langle 1, -1, 1 \rangle$$

Line thru $(2, 1, 0)$ along $v = \langle 1, -1, 1 \rangle$
 x_0, y_0, z_0 a, b, c

$$x(t) = 2 + 1t$$

$$y(t) = 1 + -1t$$

$$z(t) = 0 + 1 \cdot t$$



1/18/19 (5)

#1 $P_0 = (0, 0, 0) = (x_0, y_0, z_0)$

$$\vec{n} = \begin{matrix} \langle -1, 2, 5 \rangle \\ a \quad b \quad c \end{matrix}$$

$$-1(x-0) + 2(y-0) + 5(z-0) = 0$$

$$-x + 2y + 5z = 0$$

#2

n_2 other plane, $\parallel$,

$\boxed{5x - y - z = 6}$

$5x + (-1)y + (-1)z = 6$

$\langle a, b, c \rangle = \langle 5, -1, -1 \rangle$

Want eq'n for this plane

$$5(x_0 - 1) + (-1)(y_0 + 1) + (-1)(z_0 + 1) = 0$$

$$5x - 5 - y - 1 - z - 1 = 0$$

$$5x - y - z = 5 + 1 + 1$$

$$\boxed{5x - y - z = 7}$$

Mystery plane

$$\boxed{5x - y - z = 6}$$

Parallel plane