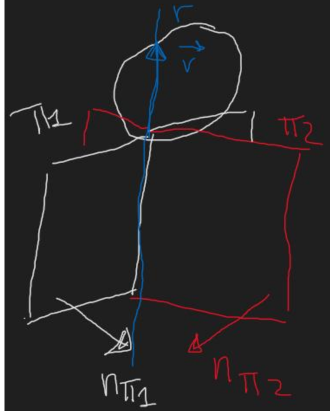
① Hallar π

- dos vect · dir + ptos
- 3 ptos
- n_π + pto paso : $ax+by+cz+d=0$
  (a,b,c)

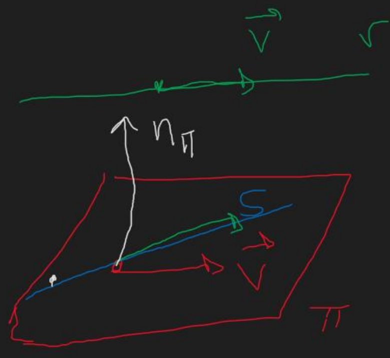


$n_{\pi_1}=(1,1,-2)$

$r = \begin{cases} x+y-z=0 \\ 3x-z=0 \end{cases}$ $\xrightarrow{\text{param}}$ $\vec{v}=(-1,-2,-3)$

$n_{\pi_2}=(3,0,-1)$

$\pi // r \Rightarrow$ $\vec{v}$ es vect. dir de π



$s \subset \pi$: $(1,0,3)$ es vect dir de π

$P=(1,1,2)\in\pi$

$\Rightarrow \pi = \begin{cases} x = \\ y = \quad \dots \\ z = \end{cases}$

reducida

$$\pi = \begin{vmatrix} x-p_1 & y-p_2 & z-p_3 \\ -1 & -2 & -3 \\ 1 & 0 & 3 \end{vmatrix} = 0$$

$\Rightarrow$ $\boxed{\pi : \; 6x-2z-2=0}$

$$\begin{vmatrix} x-2 & y-2 & z+4 \\ 1 & -1 & 0 \\ 1 & 0 & 1 \end{vmatrix} = 0 \rightarrow -(x-2)-(y-2)+(z+4)=0$$

$$-x+2-y+2+z+4=0$$

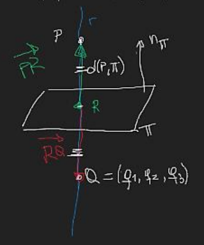
$$\boxed{-x-y+z+8=0}$$

③ $P=(2,1,1)$

$\pi = (x,y,z) = (2,2,-4)+\lambda(1,-1,0)+\mu(1,0,1) \longrightarrow \boxed{\pi: -x-y+z+8=0}$

[illegible]

$Q \,/\, d(Q,\pi) = d(P,\pi),\ d(P,Q) = 2d(P,\pi)$



$\{R\} = \pi \cap r$

Saco n_π : $(-1,-1,1)$ → vector director de r

$$r = \begin{cases} x = 2-\lambda \\ y = 1-\lambda \\ z = 1+\lambda \end{cases}$$

$\pi \cap r$:
sustituyo x, y, z de r en π.
⇒ Saco λ → sustituyo λ en r.

$$-(2-\lambda)-(1-\lambda)+1+\lambda+8=0$$

$$-2+\lambda-1+\lambda+1+\lambda+8=0 \Rightarrow 3\lambda+6=0$$

$$\boxed{\lambda=-2}$$

$$\Rightarrow \boxed{R=(4,3,-1)}$$

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

$$\overrightarrow{RP} = P-R = (-2,-2,2)$$

$$\overrightarrow{RQ} = Q-R = (q_1-4,\ q_2-3,\ q_3+1)$$

$$\overrightarrow{RP} = -\overrightarrow{RQ}$$

$$-q_1+4=-2 \Rightarrow \boxed{q_1=6}$$

$$-q_2+3=-2 \Rightarrow \boxed{q_2=5}$$

$$-q_3-1=2 \Rightarrow \boxed{q_3=-3}$$

$$Q=(6,5,-3)$$

⑦ $T_\alpha : \mathbb{R}^4 \longrightarrow \mathbb{R}^4$

$$\mathcal{E}(T)_\mathcal{E} = \begin{pmatrix} | & & | \\ T(v_1) & & \cdots \\ | & & | \end{pmatrix}$$

$\{T(v_1), T(v_2), T(v_3), T(v_4)\}$ $\xrightarrow{g}$ $\operatorname{Im}(T)$

es LI ?

$$\begin{pmatrix} 1 & 1 & \alpha+2 & -2 \\ 0 & \alpha+2 & -\alpha+2 & -2\alpha+2 \\ 0 & 0 & 3\alpha & -1 \\ 0 & 0 & 0 & \boxed{\alpha^2+2\alpha-2} \end{pmatrix}$$

• T sobreyectiva $\Longleftrightarrow$ $\overset{4}{\overset{\shortparallel}{\dim \operatorname{Im}(T)}} = \dim \underbrace{\mathbb{R}^4}_{\text{cod}}$

$\Updownarrow$

$\alpha^2 + 2\alpha - 2 \neq 0.$

• T no sobreyectiva: $\alpha^2 + 2\alpha - 2 = 0$

$\to \alpha = -1 + \sqrt{3}$

$\to \alpha = -1 - \sqrt{3}$

$\Rightarrow \dim \operatorname{Im}(T) = 3.$

$$\underbrace{v}_{4} - \underbrace{P}_{3} = 1$$