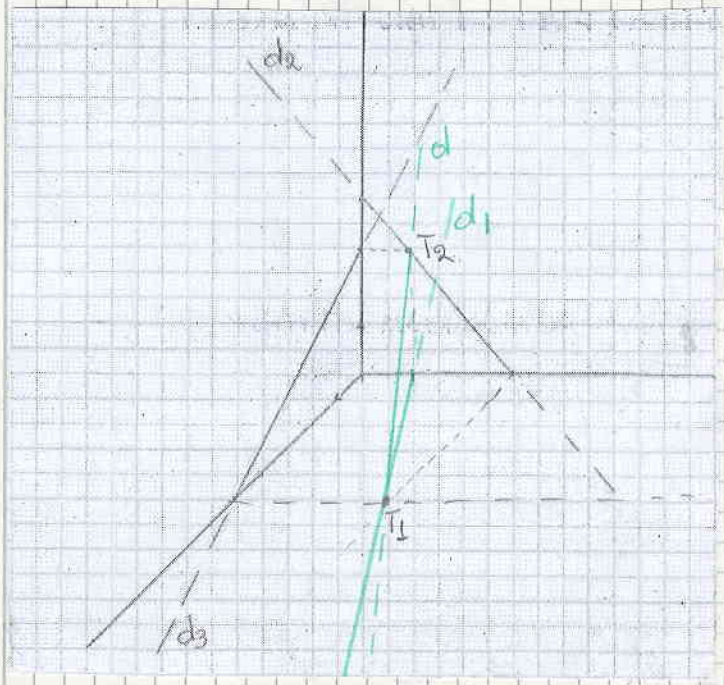
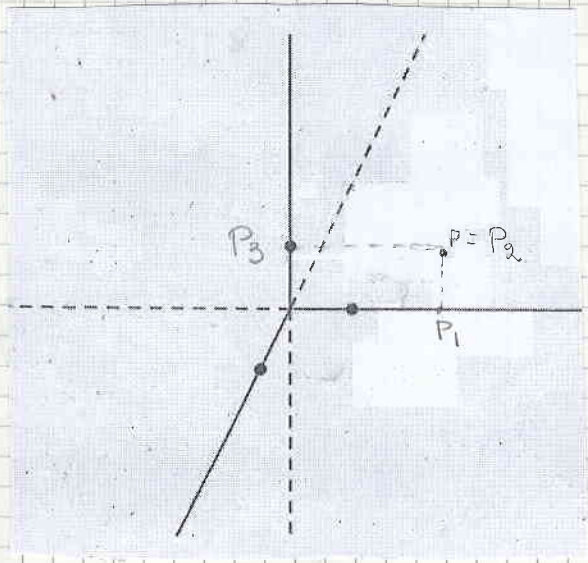
LDDR - Niveau 1 : TE 4 Géométrie 3D

Exercice 1





Exercice 2

Π : $A(0;7;0)$ $\Pi // \vec{v} = \begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix}$ $\Pi // \vec{s} = \begin{pmatrix} 0 \\ 2 \\ -1 \end{pmatrix}$ d : $\begin{cases} x = 4\lambda \\ y = 10 + \lambda \\ z = -2 - 3\lambda \end{cases}$

1) T_P ? $y = 0 \Rightarrow \lambda = -10$ $x = -40$ $z = -2 + 30 = 28$

$T_P(-40; 0; 28)$

2) $\vec{n}_\Pi = \vec{v} \wedge \vec{s} = \begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix} \wedge \begin{pmatrix} 0 \\ 2 \\ -1 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 4 \end{pmatrix}$ $x + 2y + 4z + d = 0$

A : $14 + d = 0 \Rightarrow d = -14$ Π : $x + 2y + 4z - 14 = 0$

3) $d \cap \Pi$: $4\lambda + 2(10 + \lambda) + 4(-2 - 3\lambda) - 14 = 0 \Rightarrow$

$\Rightarrow 4\lambda + 20 + 2\lambda - 8 - 12\lambda - 14 = 0 \Rightarrow -6\lambda = 2 \Rightarrow \lambda = -\frac{1}{3}$

sécants : $I = \left(-\frac{4}{3}; \frac{29}{3}; -1\right)$

Exercice 3

Π : $3x + 2y - 3z - 12 = 0$ G : $2x + 5y + 3z - 15 = 0$

1) a) $\vec{u} = \vec{n}_\Pi \wedge \vec{n}_G = \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix} \wedge \begin{pmatrix} 2 \\ 5 \\ 3 \end{pmatrix} = \begin{pmatrix} 21 \\ -15 \\ 11 \end{pmatrix}$

$21x - 15y + 11z + d = 0$

Sol : $z = 0$ $\begin{cases} 3x + 2y = 12 \\ 2x + 5y = 15 \end{cases}$ $\begin{cases} -6x - 4y = -24 \\ 6x + 15y = 45 \end{cases}$ $+$

$3x + \frac{42}{11} = 12 \Rightarrow 3x = \frac{90}{11} \Rightarrow$ $11y = 21 \Rightarrow y = \frac{21}{11}$

$x = \frac{30}{11}$ $A\left(\frac{30}{11}; \frac{21}{11}; 0\right)$

a) $\begin{cases} x = \frac{36}{11} + 21\lambda \\ y = \frac{21}{11} - 15\lambda \\ z = 11\lambda \end{cases}$

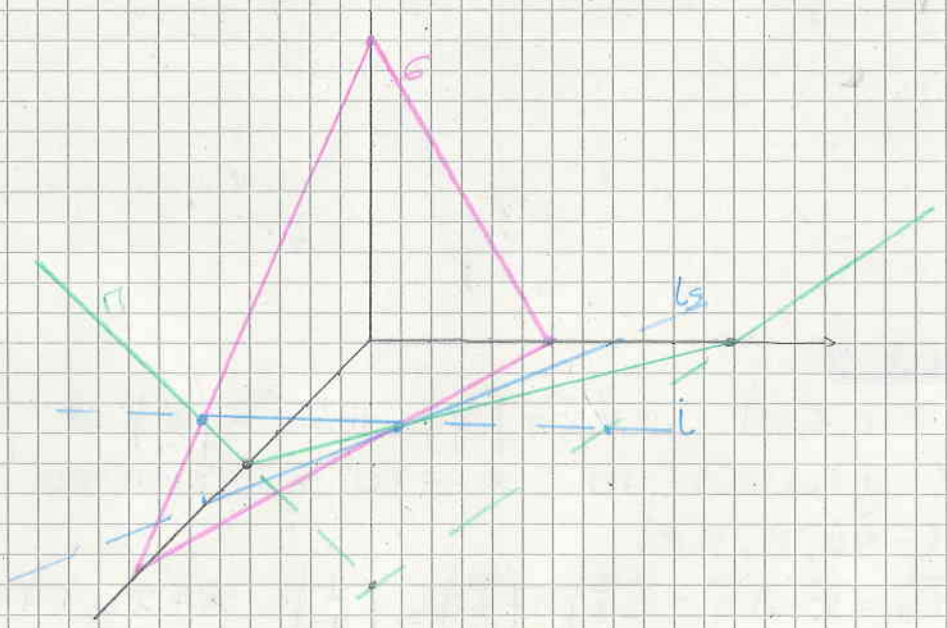
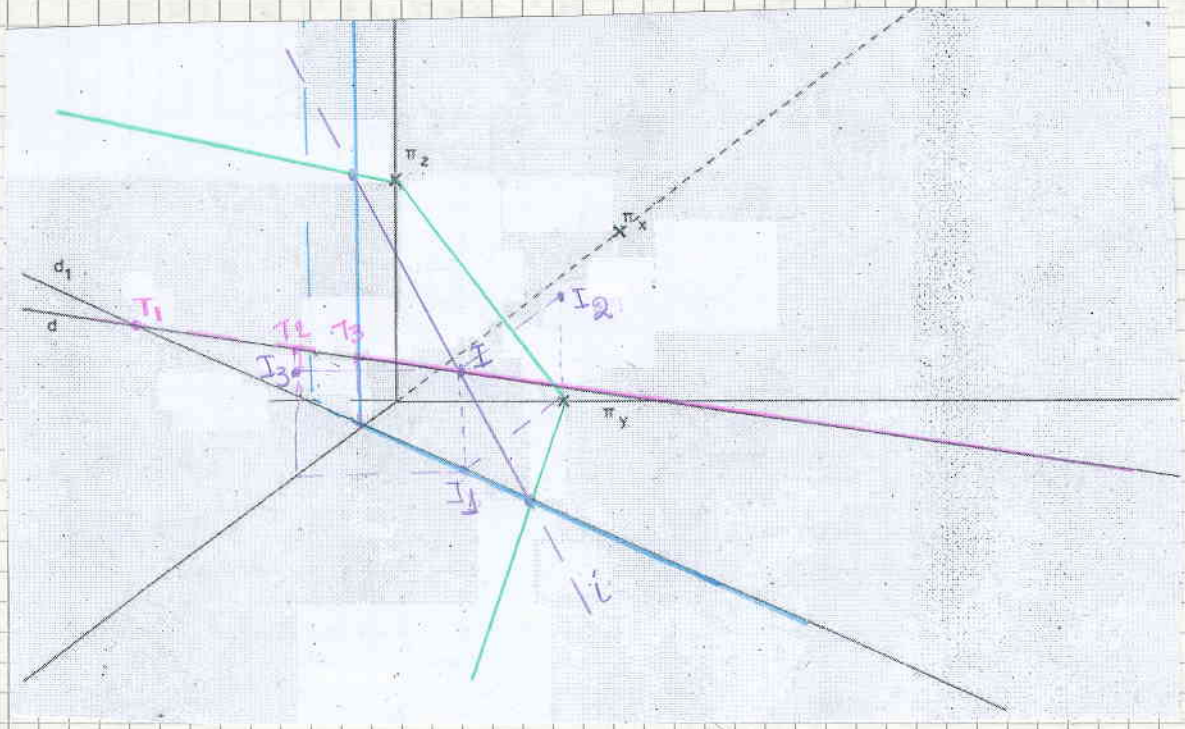
b) $\vec{n}_\Pi = \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$ $\vec{n}_G = \begin{pmatrix} 8 \\ 5 \\ 3 \end{pmatrix}$ $\cos\varphi = \dfrac{|\vec{n}_\Pi \cdot \vec{n}_G|}{\|\vec{n}_\Pi\| \cdot \|\vec{n}_G\|} =$

$\vec{n}_\Pi \cdot \vec{n}_G = 6 + 10 - 9 = 7.$

$\|\vec{n}_\Pi\| = \sqrt{9+4+9} = \sqrt{22}$ $\|\vec{n}_G\| = \sqrt{4+25+9} = \sqrt{38}$

$\cos\varphi = \dfrac{7}{\sqrt{22}\sqrt{38}} \Rightarrow \varphi = 75.99°$

2)



EXERCICE 4