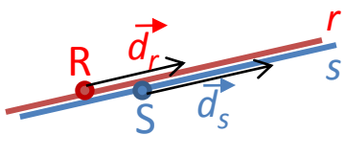
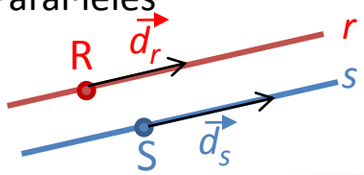
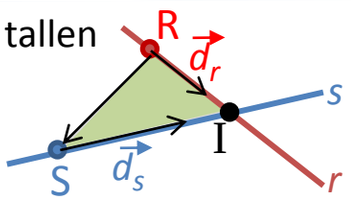
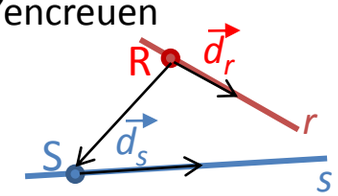
Posicions relatives de rectes i plans a l'espai

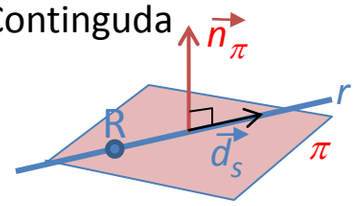
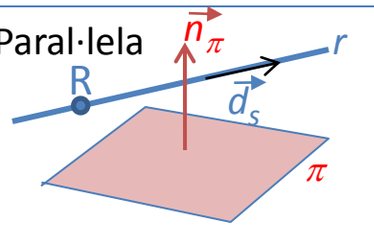
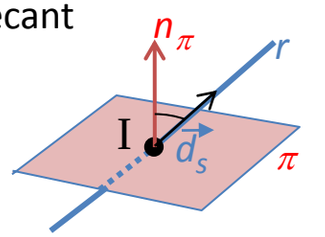
Recta - Recta

$$r:\begin{cases} Ax+By+Cz=D \\ A'x+B'y+C'z=D' \end{cases} \qquad s:\begin{cases} A''x+B''y+C''z=D'' \\ A'''x+B'''y+C'''z=D''' \end{cases}$$

	RANGS	PUNTS - VECTORS
Coincidents 	rang M = rang M^* = 2	$\vec{d}_r \,//\, \vec{d}_s$ *si* $R \in r \rightarrow R \in s$
Paral·leles 	rang M = 2 ≠ rang M^* = 3	$\vec{d}_r \,//\, \vec{d}_s$ *si* $R \in r \rightarrow R \notin s$
Es tallen 	rang M = rang M^* = 3	$\det(\vec{d}_r, \vec{d}_s, \vec{RS}) = 0$
S'encreuen 	rang M = 3 ≠ rang M^* = 4	$\det(\vec{d}_r, \vec{d}_s, \vec{RS}) \neq 0$

Recta - Pla

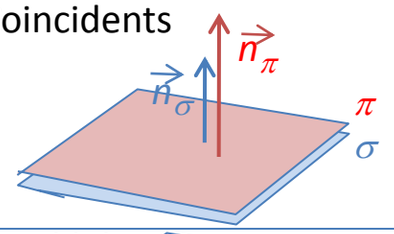
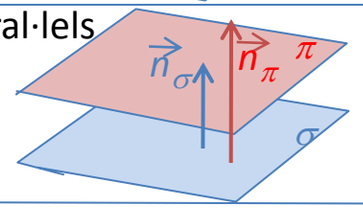
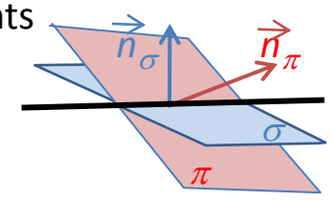
$$r:\begin{cases} Ax+By+Cz=D \\ A'x+B'y+C'z=D' \end{cases} \qquad \pi: \{A''x+B''y+C''z=D''$$

	RANGS	PUNTS - VECTORS
Continguda 	rang M = rang M^* = 2	$\vec{d}_r \perp \vec{n}_\pi$ *si* $R \in r \rightarrow R \in \pi$
Paral·lela 	rang M = 2 ≠ rang M^* = 3	$\vec{d}_r \perp \vec{n}_\pi$ *si* $R \in r \rightarrow R \notin \pi$
Secant 	rang M = rang M^* = 3	$\vec{d}_r \cdot \vec{n}_\pi \neq 0$

Pla - Pla

$$\pi:\{Ax+By+Cz=D \qquad \sigma:\{A'x+B'y+C'z=D'$$

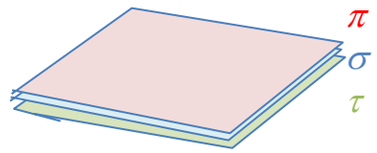
2 Plans: Sistema 2x3

	RANGS	PUNTS - VECTORS
Coincidents 	rang M = rang M^* = 1	$\vec{n}_\pi \,//\, \vec{n}_\sigma$ *si* $P \in \pi \rightarrow P \in \sigma$
Paral·lels 	rang M = 1 ≠ rang M^* = 2	$\vec{n}_\pi \,//\, \vec{n}_\sigma$ *si* $P \in \pi \rightarrow P \notin \sigma$
Secants 	rang M = rang M^* = 2	$\vec{n}_\pi, \vec{n}_\sigma$ independents

3 Plans : Sistema 3x3

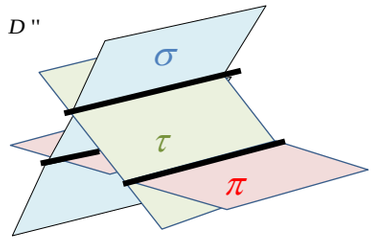
Coincidents

$$\pi:\{Ax+By+Cz=D \qquad \sigma:\{A'x+B'y+C'z=D' \qquad \tau:\{A''x+B''y+C''z=D''$$



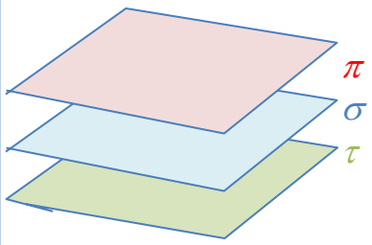
rang M = rang M^* = 1

Secants dos a dos



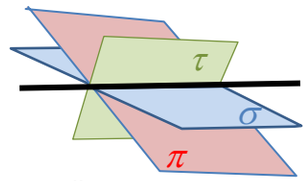
rang M = 2 ≠ rang M^* = 3

Paral·lels



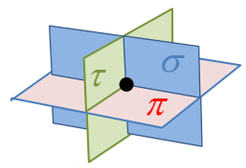
rang M = 1 ≠ rang M^* = 2

Secants



Es tallen en una *recta*

rang M = rang M^* = 2



Es tallen en una *punt*

rang M = rang M^* = 3