Seminario 1 (Tema ...)

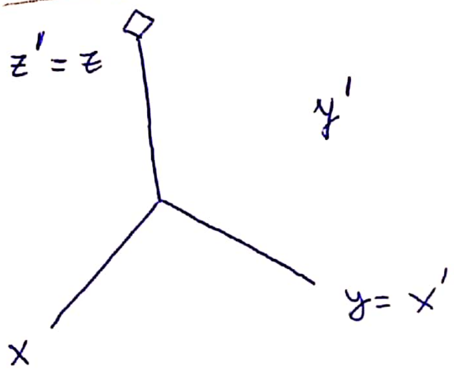
	x'	y'	z'
x	$\cos xx'$	$\cos xy'$	$\cos xz'$
y	$\cos yx'$	$\cos yy'$	$\cos yz'$
z	$\cos zx'$	$\cos zy'$	$\cos zz'$

1

$\boxed{C_4^1}$ → (1 giro de 90°) / C_4^2 (2 giros de 90°) C_4^3 (3 giros de 90°) C_4^4 (4 giros de 90°)

90°

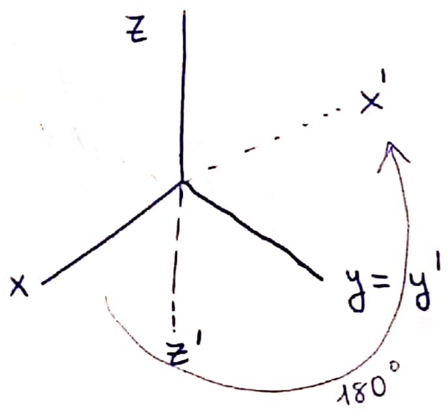
tomar eje z (pq no especifican eje)



$$\begin{pmatrix} \cos 90 & \cos 180 & \cos 90 \\ \cos 0 & \cos 90 & \cos 90 \\ \cos 90 & \cos 90 & \cos 0 \end{pmatrix} = \begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \; C_4^1$$

$\boxed{C_2^y}$

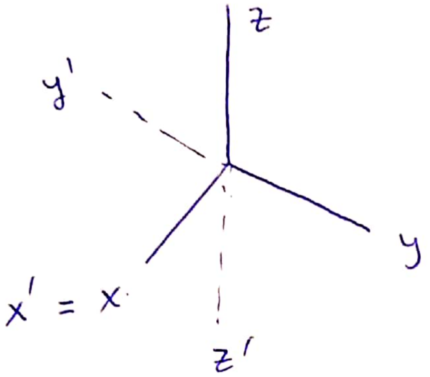
180° tomar eje Y



$$\begin{pmatrix} \cos 180 & \cos 90 & \cos 90 \\ \cos 90 & \cos 0 & \cos 90 \\ \cos 90 & \cos 90 & \cos 180 \end{pmatrix} = \begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix} \; C_{2y}$$

$|C_2^x|$

giro alrededor del eje X



$$= \begin{pmatrix} \cos 0 & \cos 90 & \cos \\ \cos \dots & \cos & \cos \\ \cos \dots & \cos & \cos \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix} \quad C_{2}x$$

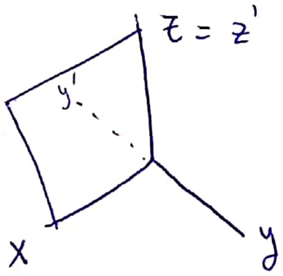
(2)

$$\sigma x.z. \; \sigma xy =$$

$\downarrow$

Cojo el 2º término y lo multiplico por el 1º.

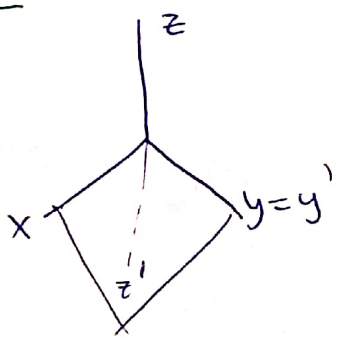
σxz → Plano que contiene al eje x y al eje z.



$$= \begin{pmatrix} \cos \dots & \cos \dots & \cos \\ \cos \dots & \cos \dots & \cos \\ \cos \dots & \cos \dots & \cos \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$$

$\sigma_{x}{}^{z}$

σxy → Plano que contiene al eje x y al eje y.



$$= \begin{pmatrix} \cos \dots & \cos & \cos \\ \cos & \cos & \cos \\ \cos & \cos & \cos \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$$

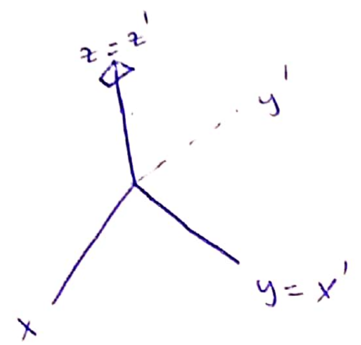
σxy

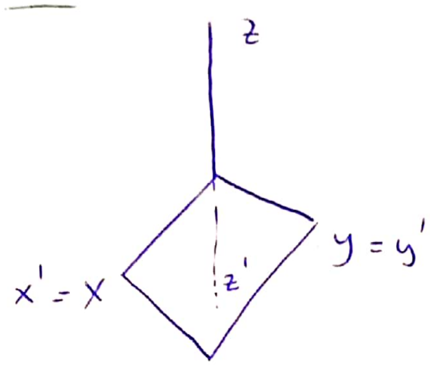
empiezo por el 2º término

$$\sigma xz . \sigma xy = \underbrace{\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}}_{\sigma_{xy}} \underbrace{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}}_{\sigma xz} = \underbrace{\boxed{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}}}_{C_2^1}$$

Escaneado con CamScanner

$C_4^1 \cdot \sigma h =$ → Plano perpendicular al eje z





$$C_4^1 \cdot \sigma h = \underset{\sigma h}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}} \underset{C_4^1}{\begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}} = \underset{S_4^1}{\begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & -1 \end{pmatrix}}$$

$\boxed{3}$

$$\underset{(2^\circ)}{\sigma h} \cdot \underbrace{C_1 \cdot C_2}_{(1^\circ)}$$

1º) opero $C_1 \cdot C_2$
2º) $(C_1 \cdot C_2)$ lo multiplico por σh

DATOS:

$C_1 \rightarrow$ coincide con eje z

$C_2 \rightarrow$ coincide con el eje X

(1º)

$$C_1 \cdot C_2 = \underset{C_2}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}} \underset{C_1}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}} = \underset{C_{2x}}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}}$$

(2º)

$$\sigma h \cdot C_{2x} = \underset{C_{2x}}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}} \cdot \underset{\sigma h}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}} = \boxed{\underset{\sigma xz}{\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}}}$$

↓ perpendicular al eje z

coordenada $\left(\frac{1}{2}\ \frac{1}{2}\ 0\right)$ le aplico la operación para hallar nuevas coordenadas ⇒

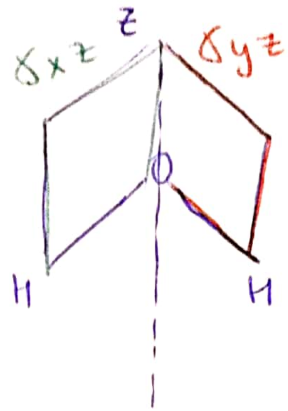
$$\begin{pmatrix} x' \\ y' \\ z' \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \\ 0 \end{pmatrix} = \boxed{\begin{pmatrix} 1/2 \\ -1/2 \\ 0 \end{pmatrix}}$$

← solución

$\boxed{4}$)

Molécula de H_2O :

C_{2v}



C_2^1 (180°)

$$C_2^1 = \begin{pmatrix} \quad & \quad \end{pmatrix}$$

$$\sigma_{xz} = \begin{pmatrix} \quad & \quad \end{pmatrix}$$

$$\sigma_{xy} = \begin{pmatrix} \quad & \quad \end{pmatrix}$$