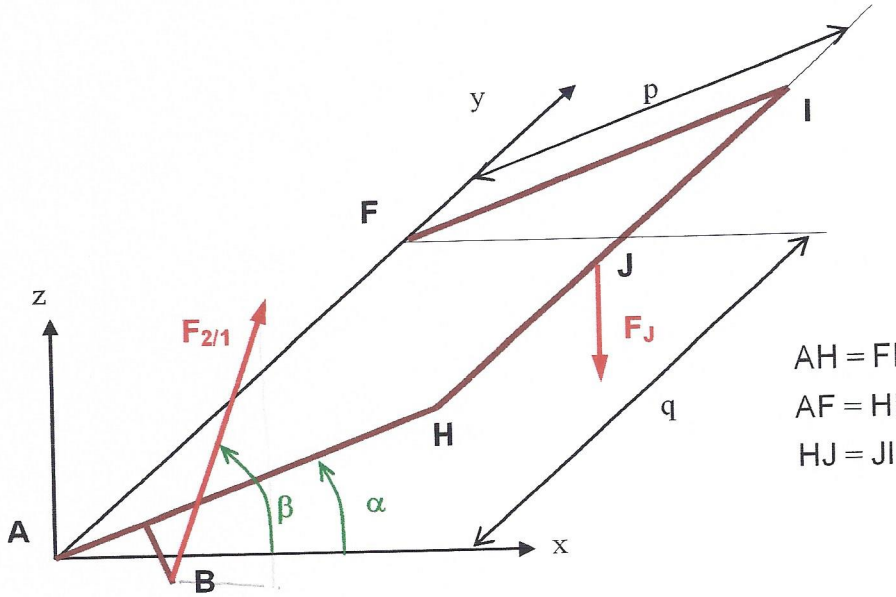
Efforts de liaison



AH = FI = p
AF = HI = q
HJ = JI = q/2

$R_1 = (A, xyz)$

en A liaison S/S $\begin{bmatrix} X_A & 0 \\ Y_A & 0 \\ Z_A & 0 \end{bmatrix}_A$; en F $\begin{bmatrix} X_F & 0 \\ 0 & 0 \\ Z_F & 0 \end{bmatrix}_F$

PFS réduit en A

$[F_{21}] = \begin{bmatrix} F_{21}c\beta & 0 \\ 0 & 0 \\ F_{21}s\beta & 0 \end{bmatrix}_B$ $\quad [F_J] = \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ -F_J & 0 \end{bmatrix}_J$

avec $B \begin{vmatrix} r \\ 0 \\ s \end{vmatrix}$

$/\vec{x}$: $X_A + X_F + F_{21}c\beta = 0$ (1)

$/\vec{y}$: $Y_A = 0$ (2)

$/\vec{z}$: $Z_A + Z_F + F_{21}s\beta = F_J$ (3)

$M_{t,A}$ $\quad \vec{AB} \wedge \begin{vmatrix} F_{21}c\beta \\ 0 \\ F_{21}s\beta \end{vmatrix} + \vec{AJ} \begin{vmatrix} 0 \\ 0 \\ -F_J \end{vmatrix} + \vec{AF} \begin{vmatrix} X_F \\ 0 \\ Z_F \end{vmatrix} = \vec{0}$

$\begin{vmatrix} r \\ 0 \\ s \end{vmatrix} \wedge \begin{vmatrix} F_{21}c\beta \\ 0 \\ F_{21}s\beta \end{vmatrix} + \begin{vmatrix} pc\alpha \\ q/2 \\ ps\alpha \end{vmatrix} \wedge \begin{vmatrix} 0 \\ 0 \\ -F_J \end{vmatrix} + \begin{vmatrix} 0 \\ q \\ 0 \end{vmatrix} \wedge \begin{vmatrix} X_F \\ 0 \\ Z_F \end{vmatrix}$

$$\begin{matrix} 0 & & -\frac{q}{2}F_J & + qZ_F = 0 & (4) \\ sF_{21}c\beta - rF_{21}s\beta + p^2F_J c\alpha & & & = 0 & (5) \\ 0 & & 0 & -qX_F = 0 & (6) \end{matrix}$$

(6) $X_F = 0$ $\quad$ (4) $Z_F = 2F_J$

(2) $Y_A = 0$ $\quad$ (5) $F_{21} = \dfrac{pc\alpha}{rs\beta - sc\beta} F_J$

(1) $X_A = -F_{21}\cos\beta$ $\quad X_A = \dfrac{P\cos\alpha\cos\beta}{s\cos\beta - r\sin\beta}F_J$

(3) $Z_A = F_J + \dfrac{P\cos\beta\sin\beta}{s\cos\beta - r\sin\beta}F_J - 2F_J$

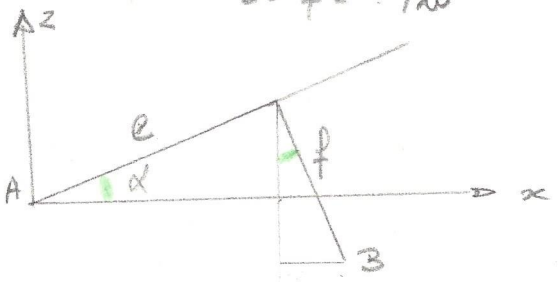
$Z_A = \dfrac{P\cos\beta\sin\beta - s\cos\beta - r\sin\beta}{s\cos\beta - r\sin\beta}F_J$

A.N: $K = 0$

$\beta = 45°$

$e = f = P/10$

$F_{21} = \dfrac{P\,2}{(r-s)\sqrt{2}}F_J$



$$\vec{AB}\begin{vmatrix} e\cos\alpha + f\sin\alpha = r \\ 0 \\ e\sin\alpha - f\cos\alpha = s \end{vmatrix}$$

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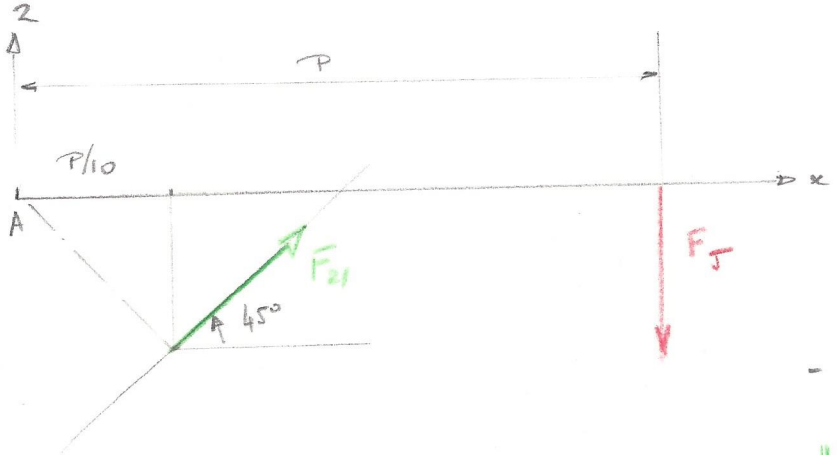
AN: $\vec{AB}\begin{vmatrix} e \\ 0 \\ -f \end{vmatrix}$ $\quad \vec{AB}\begin{vmatrix} P/10 = r \\ 0 \\ -P/10 = s \end{vmatrix}$

$F_{21} = \dfrac{2P}{(P/10 + P/10)\sqrt{2}}$ $\quad F_J = \dfrac{2P}{2P\sqrt{2}}\omega F_J$

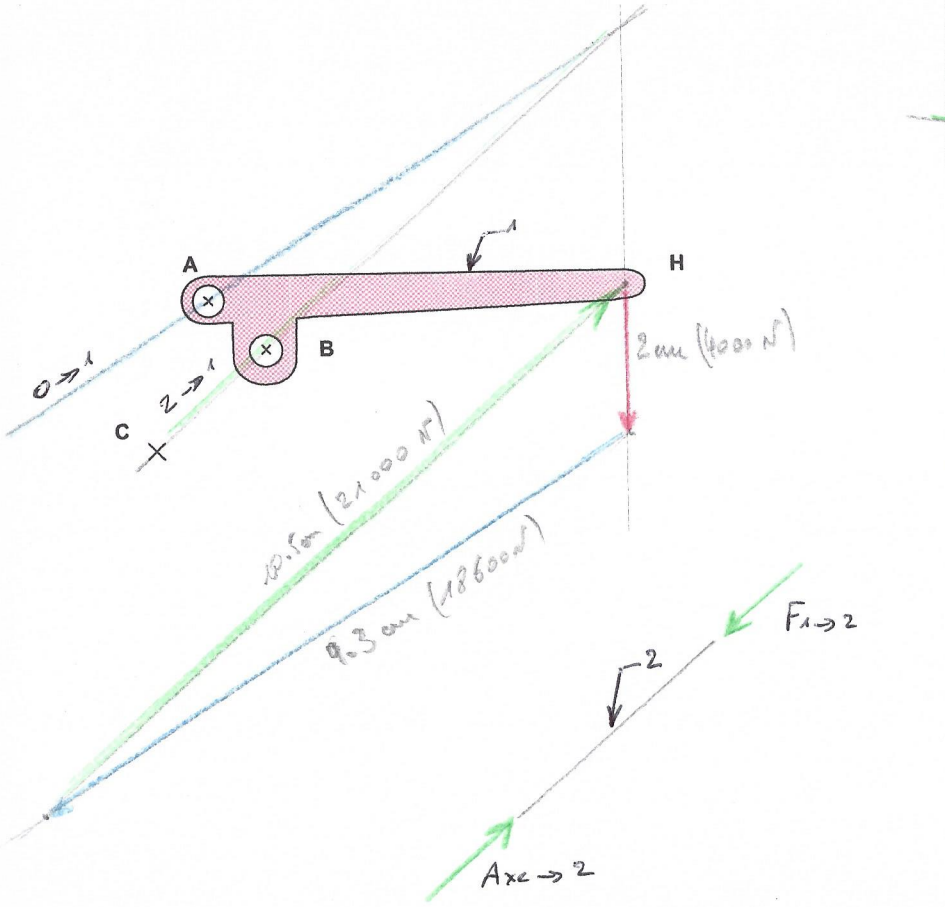
$F_{21} = \dfrac{\omega F_J}{\sqrt{2}}$



$-F_J P + F_{21}\dfrac{\sqrt{2}P}{\omega} = 0$

$F_{21} = F_J\dfrac{\omega}{\sqrt{2}}$

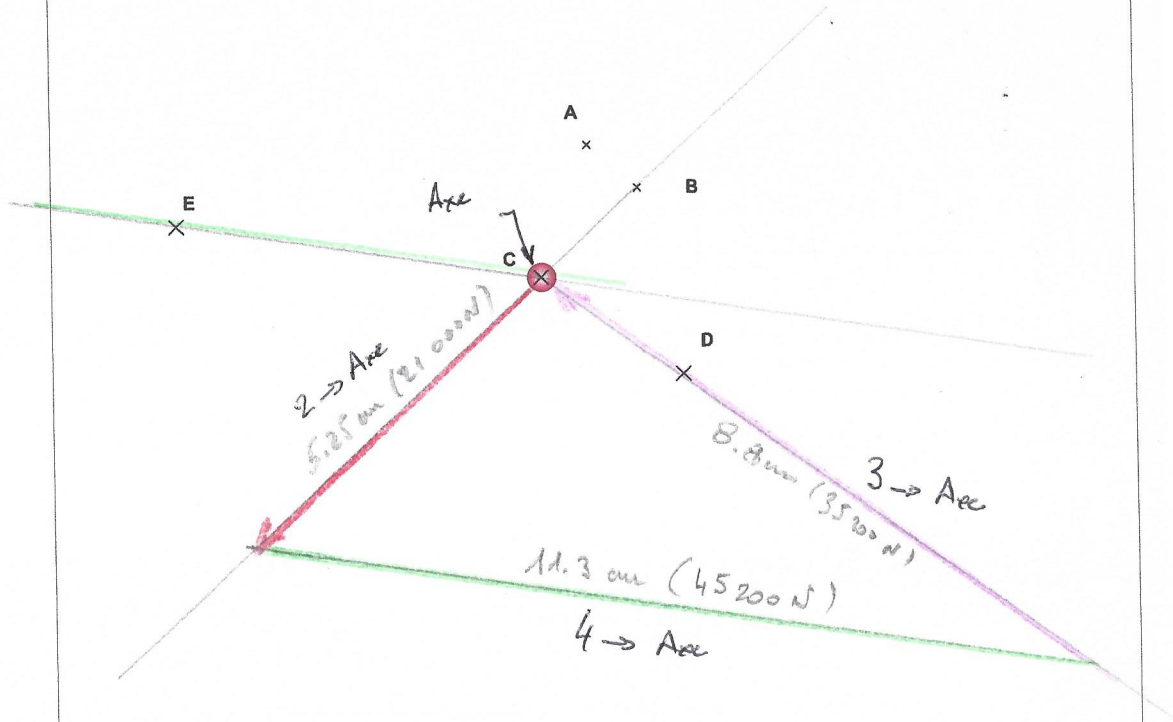
NOM : **Groupe :**



$|\vec{F}_{2/1}| = 21\,000\,N$ $|\vec{F}_{0/1}| = 18\,600\,N$

Figure 5R

1cm→ 2 000 N



$|\vec{F}_{Axe\_C/4}| = 45\,200\,N$ $|\vec{F}_{Axe\_C/3}| = 35\,200\,N$

Figure 6R

1cm→ 4 000 N