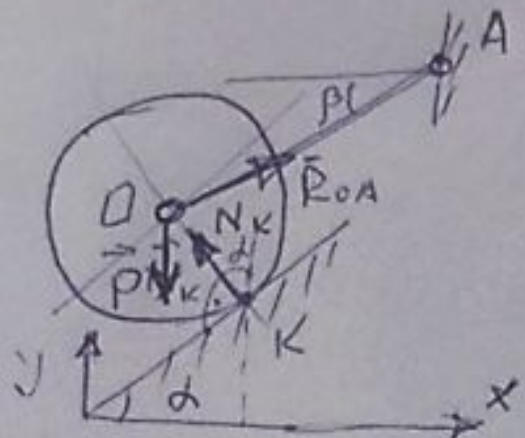


Дано: P, α, β

Знайти: 1) тиск кулі на поверхню;
2) зусилля в стержні OA.

О.р. – куля.

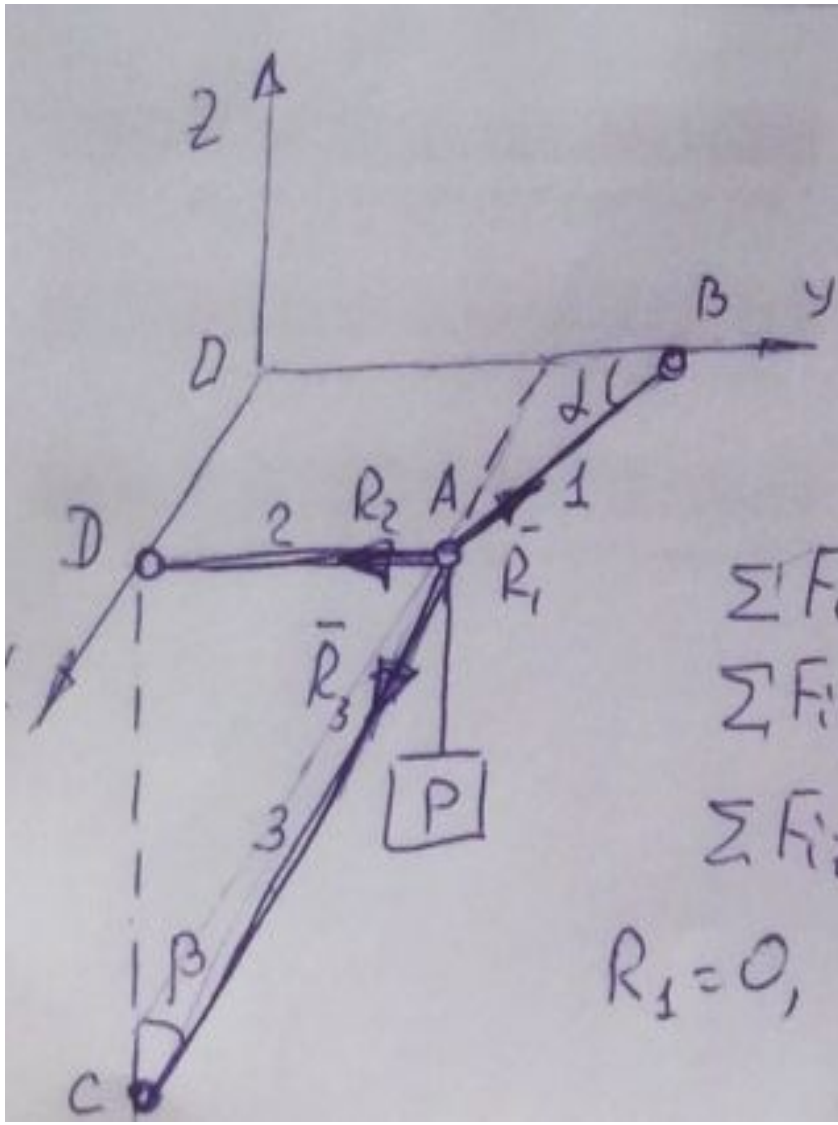
$$\sum F_{ix} = 0, \quad -N_K \sin\alpha + R_{OA} \cos\beta = 0$$

$$\sum F_{iy} = 0, \quad N_K \cos\alpha + R_{OA} \sin\beta - P = 0$$

$$N_K = R_{OA} \frac{\sin\beta}{\sin\alpha};$$

$$R_{OA}\left(\frac{\sin\beta}{\sin\alpha} \cdot \cos\alpha + \sin\beta\right) - P = 0$$

$$R_{OA} = \frac{P}{\sin\beta \operatorname{ctg}\alpha + \sin\beta};$$



Дано: P, α, β

$R_1, R_2, R_3 = ?$

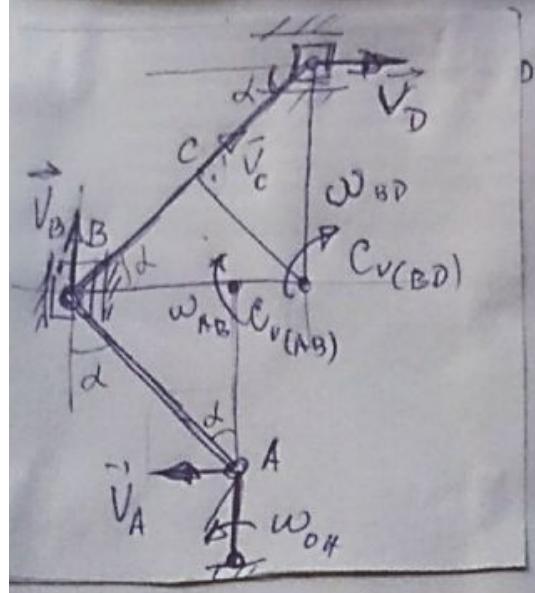
О.Р. – вузол А

$\sum F_{ix} = 0; \; -R_1 \sin\alpha = 0$

$\sum F_{iy} = 0; \; R_1 \cos\alpha - R_2 - R_3 \sin\beta = 0$

$\sum F_{iz} = 0 \; -P - R_3 \cos\beta = 0$

$R_1 = 0, \quad R_3 = -\frac{P}{\cos\beta}, \quad R_2 = -\left(-\frac{P}{\cos\beta}\right) = \frac{P}{\cos\beta}$



Дано: $OA = 1м$

$\alpha = 45°$ $\omega_{OA} = 8 с^{-1}$

$AB = 1м$, $BC = CD = 0,8м$

$V_A = \omega_{OA} \cdot |OA| = 1 \cdot 8 = 8$ м/с

$V_A = \omega_{AB} |AC_V|$, $\omega_{AB} = \frac{V_A}{AC_V}$

$AC_{V(AD)} = AB \cos\alpha = 1 \cdot \cos 45° =$

$= 1 \cdot 0,71 = 0,71м.$

$\omega_{AB} = \frac{8}{0.71} = 11,26 с^{-1}$

$V_B = \omega_{AB} \cdot |BC_V|_{(AB)} = 11.26 \cdot 0,71 = 8$ м/с

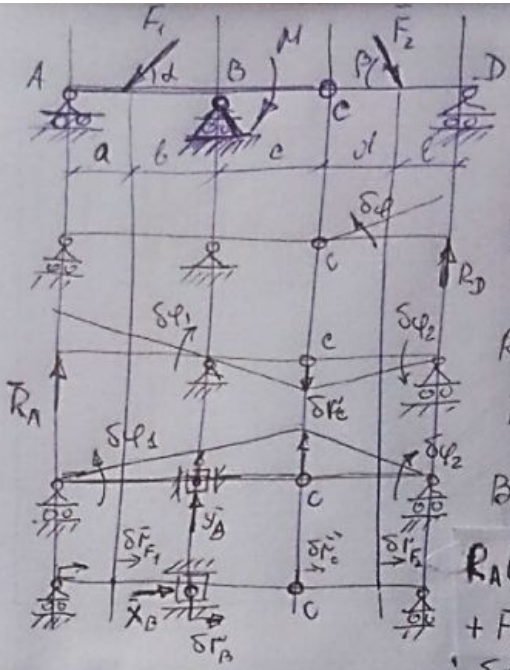
$V_B = \omega_{BD} \cdot BC_{V(BD)}$, $\omega_{BD} = \frac{V_B}{|BC_V|_{(BD)}} = \ldots$

$BC_{V(BD)} = BD \cos\alpha = 1,6 \cdot 0,71 = 1,14м$

$\omega_{BD} = \frac{8}{1.14} = 7,02 с^{-1}$

$V_C = \omega_{BD} |CC_V|$; $CC_V = BC = 0,8м$

$V_C = 7,02 \cdot 0,8 = 5,62$ м/с



Дано: F_1, F_2, α, β
M, a, b, c, d, l

R_A, R_B, R_D - ?

Визначимо R_D

$\sum M_c(\vec{F}_i) \cdot \delta\varphi = 0$

$R_D \cdot (d+l)\delta\varphi - F_2 \sin\beta \cdot d \cdot \delta\varphi = 0$

$R_D = \frac{F \sin\beta \cdot d}{d+l}$;

Визначимо R_A

$R_A(a+b)\delta\varphi_1 - F_1 \sin\alpha \, b \cdot \delta\varphi_1 + M\delta\varphi_1 + F_2 \sin\beta \, \delta\varphi_2 \cdot b = 0$

$\delta r_C = \delta\varphi_1 \cdot c = \delta\varphi_2 (d+l)$

$\delta\varphi_2 = \delta\varphi_1 \frac{c}{d+l}$; $R_A(a+b)\delta\varphi_1 - F_1 \sin\alpha \cdot b \, \delta\varphi_1 + M \cdot \delta\varphi_1 + F_2 \sin\beta \, \delta\varphi_1 \cdot \frac{c \cdot l}{d+l} = 0$; $R_A =$

Визначимо $\vec{Y}_B$

$-F_1 \sin\alpha \cdot a \, \delta\varphi_1 + Y_B(a+b) \cdot \delta\varphi_1 - M\delta\varphi_1 + F_2 \sin\beta \cdot l \cdot \delta\varphi_2 = 0$

$\delta r_C = \delta\varphi_1 (a+b+c) = \delta\varphi_2 (d+l)$, $\delta\varphi_2 = \delta\varphi_1 \frac{a+b+c}{d+l}$;

$-F_1 \sin\alpha \cdot a \, \delta\varphi_1 + Y_B(a+b)\delta\varphi_1 - M\delta\varphi_1 - F_2 \sin\beta \cdot l \cdot \delta\varphi_1 \frac{a+b+c}{d+l} = 0$

$Y_B =$

Визначимо $\vec{X}_B$

$\sum \vec{F}_i \cdot \delta\vec{r}_i = 0$

$-F_1 \cos\alpha \, \delta r_{F_1} + X_B \cdot \delta r_B + F_2 \cos\beta \cdot \delta r_{F_2} = 0$

$\delta r_C = \delta r_B = \delta r_{F_2}$ - пост. $X_B = F_1 \cos\alpha - F_2 \cos\beta$.