Problem 4-6

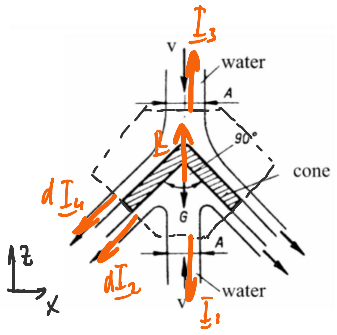
2022. április 8., péntek 11:43

4/6 $A = 10^{-4}\,m^2$

$v = 10\,m/s$

Friction and gravity are negligible.

Determine the weight of body 'G' [N]!



$$\int_A \underline{v}\,\rho\,\underline{v}\,d\underline{A} = \int_V \underline{g}\,dm - \int_A p\,d\underline{A} - \underline{R}$$

$\sum \underline{I}$ | test | $p_0 \int_A d\underline{A}$

$$\underline{I}_1 = \underline{v}_1(\rho \underline{v}_1 \underline{A}_1) = \begin{bmatrix} 0 \\ -v_1 q_{m1} \end{bmatrix}$$

$$\underline{I}_3 = \underline{v}_3(\rho \underline{v}_3 \underline{A}_3) = \begin{bmatrix} 0 \\ v_3 q_{m3} \end{bmatrix}$$

$$\underline{R} = \begin{bmatrix} R_x \\ R_z \end{bmatrix}$$

$$\underline{I}_2 = \int_{A_2} d\underline{I}_2 = \int_{A_2} \underline{v}_2 \rho \underline{v}_2 d\underline{A} = \begin{bmatrix} 0 \\ -v_2 \sin\left(\frac{\varepsilon}{2}\right) q_{m2} \end{bmatrix}$$

$$\underline{I}_4 = \int_{A_4} d\underline{I}_4 = \int_{A_4} \underline{v}_4 \rho \underline{v}_4 d\underline{A} = \begin{bmatrix} 0 \\ -v_4 \sin\left(\frac{\varepsilon}{2}\right) q_{m4} \end{bmatrix}$$

(x) $0 = -R_x \quad R_x = 0$

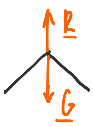
(z) $-v_1 q_{m1} - v_2 \sin\left(\frac{\varepsilon}{2}\right) q_{m2} + v_3 q_{m3} - v_4 \sin\left(\frac{\varepsilon}{2}\right) q_{m4} = -R_y$

$v_1 = v$ (BE 1-2, cont.) $\quad q_{m1}$ (cont.) $\quad v_3 = v$ $\quad q_{m3} = q_{m1}$ $\quad v_2 = v_4$ (BE 3-4, cont.) $\quad q_{m3}$ (cont.)

$$q_{m1} = \rho v A$$
$$q_{m3} = \rho v A$$

$$-v q_{m1} - v \sin\left(\frac{\varepsilon}{2}\right) q_{m1} + v q_{m1} - v \sin\left(\frac{\varepsilon}{2}\right) q_{m1} = -R_y$$

$$R_y = 2 v \sin\left(\frac{\varepsilon}{2}\right) q_{m1} = 14.14\,N$$



$$\underline{R} - \underline{G} = \underline{0}$$

(z) $G = R = 14.14\,N$