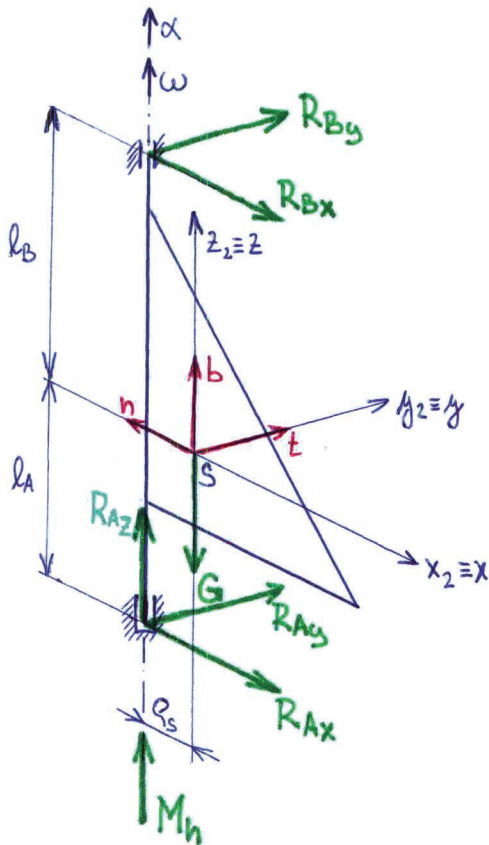


D: $\omega, \alpha, h_1, h_2, s, l, d, \rho$

($\rightarrow m, I_{x_2}, I_{y_2}, I_{z_2}, D_{z_2 x_2}, D_{x_2 y_2} = D_{y_2 z_2} = 0$)

u: N-E rovnice

řešení v systému "2" (index "2" vynecháme)



$$m \underline{a}_s = \sum_i \underline{F}_i \quad \text{Newton}$$

$$\frac{d\underline{L}_s}{dt} = \sum_i \underline{M}_{s_i}$$

↓

$$\underline{I}_s \underline{\alpha} + \underline{\omega} \times \underline{I}_s \underline{\omega} = \sum_i \underline{M}_{s_i} \quad \text{Euler}$$

$$\underline{L}_s = \underline{I}_s \underline{\omega} = \begin{bmatrix} I_x & 0 & -D_{x_2} \\ 0 & I_y & 0 \\ -D_{x_2} & 0 & I_z \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ \omega \end{bmatrix} = \begin{bmatrix} -D_{x_2} \omega \\ 0 \\ I_z \omega \end{bmatrix}$$

$$\underline{\omega} \times \underline{I}_s \underline{\omega} = \begin{bmatrix} 0 & -\omega & 0 \\ \omega & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} -D_{x_2} \omega \\ 0 \\ I_z \omega \end{bmatrix} = \begin{bmatrix} 0 \\ -D_{x_2} \omega^2 \\ 0 \end{bmatrix}$$

$$\underline{I}_s \underline{\alpha} = \begin{bmatrix} I_x & 0 & -D_{x_2} \\ 0 & I_y & 0 \\ -D_{x_2} & 0 & I_z \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ \alpha \end{bmatrix} = \begin{bmatrix} -D_{x_2} \alpha \\ 0 \\ I_z \alpha \end{bmatrix}$$

$$t: m \cdot a_t = R_{Ay} + R_{Bz}$$

$$n: m \cdot a_n = -R_{Ax} - R_{Bz}$$

$$b: m \cdot a_b = 0 = R_{Az} - G$$

$$\varphi_x: -D_{x_2} \cdot \alpha = R_{Ay} \cdot l_A - R_{Bz} \cdot l_B$$

$$\varphi_y: -D_{x_2} \cdot \omega^2 = R_{Bz} \cdot l_B - R_{Ax} \cdot l_A + R_{Az} \cdot r_s$$

$$\varphi_z: I_z \cdot \alpha = M_h - (R_{Ay} + R_{Bz}) \cdot r_s$$

$$(l_A = h_1 + \frac{1}{3} h_2; l_B = l - l_A; r_s = \frac{1}{3} d; a_t = \frac{d}{3} \alpha; a_n = \frac{d}{3} \omega^2; a_b = 0)$$

t, n, b ... tečna, normála, binormála