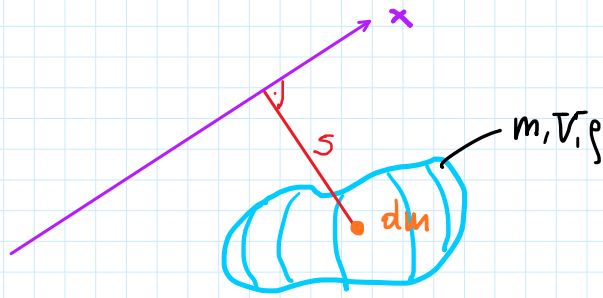


MOMENTY BEZWAŁOWOŚCI I DEWIACJI

$$J_x = \int_V s^2 dm$$



$$\bar{F} = m\bar{a}$$

DLA RUCHU OBRÓT:

$$M = J\varepsilon$$

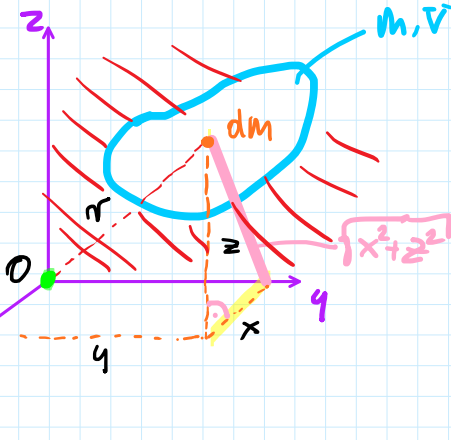
MOMENTY BEZWAŁOWOŚCI WZGLĘDNE:

PLASZCZYZNA:

$$J_{xx} = \int_m x^2 dm \quad (\text{Pl. } y, z)$$

$$J_{yy} = \int_m y^2 dm \quad (\text{Pl. } x, z)$$

$$J_{zz} = \int_m z^2 dm \quad (\text{Pl. } x, y)$$



WZGLĘDNE OŚI:

$$J_x = \int_m (y^2 + z^2) dm, \quad J_y = \int_m (x^2 + z^2) dm, \quad J_z = \int_m (x^2 + y^2) dm$$

$$J_x = \int_m y^2 dm + \int_m z^2 dm = J_{yy} + J_{zz}$$

$$J_y = \dots = J_{xx} + J_{zz}$$

$$J_z = \dots = J_{xx} + J_{yy}$$

WZGLĘDNE PUNKTU:

$$J_o = \int_m r^2 dm = \int_m (x^2 + y^2 + z^2) dm =$$

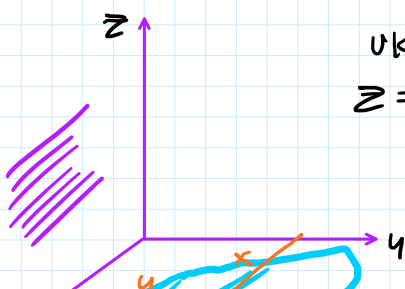
$$= J_{xx} + J_{yy} + J_{zz}$$

$$J_o = J_{xx} + J_{yy} + J_{zz} \quad / \cdot 2$$

$$2J_o = 2J_{xx} + 2J_{yy} + 2J_{zz}$$

$$2J_o = J_{xx} + J_{zz} + J_{xx} + J_{yy} + J_{yy} + J_{zz} = J_y + J_z + J_x$$

$$J_o = \frac{J_x + J_z + J_y}{2}$$



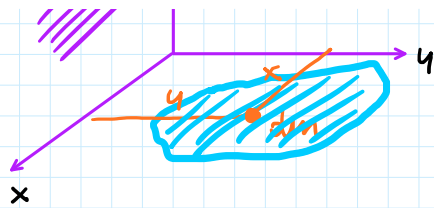
UKŁAD PŁASKI

$$z = 0$$

$$J_x = \int_m (y^2 + z^2) dm = \int_m (y^2 + 0^2) dm = \int_m y^2 dm = J_{yy}$$

$$J_y = \int_m (x^2 + z^2) dm = J_{xx}$$

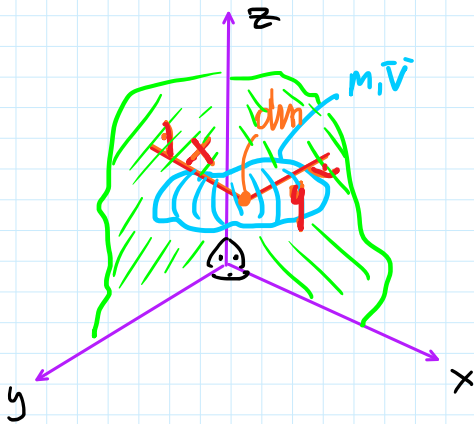
$$J_z = \int_m (x^2 + y^2) dm = J_{xx} + J_{yy} = J_y + J_x$$



$$J_z = \int_m (x^2 + y^2) dm = J_{xx} + J_{yy} = J_y + J_x$$

$$J_z = J_y + J_x$$

NOMENTY DEWACJI (ZBROCZENIA, NIEWYRÓWNOWAŻENIA)



$$D_{xy} = J_{xy} = \int_m xy \, dm$$

$$D_{yz} = J_{yz} = \int_m yz \, dm$$

$$D_{zx} = J_{zx} = \int_m zx \, dm$$