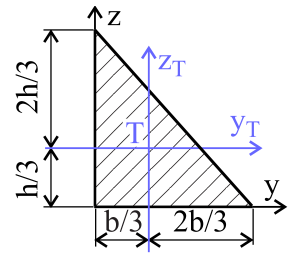
Central axes intersect each other in the centre of gravity of the cross section (y_T, z_T). We can turn profit of the formulas derived for the right triangle using the basic integral relations. These quadratic moments are related to the axes lying in the triangle legs (y, z) and we can transform them (using Steiner's theorem) into relations valid for the central axes.



Back to problem

basic shapes

Steiner's theorem

$$J_y = J_{y_T} + \left(-\frac{h}{3}\right)^2 S \quad \Rightarrow \quad J_{y_T} = \frac{bh^3}{12} - \left(-\frac{h}{3}\right)^2 \frac{bh}{2} = \frac{bh^3}{36}$$

$$J_z = J_{z_T} + \left(-\frac{b}{3}\right)^2 S \quad \Rightarrow \quad J_{z_T} = \frac{hb^3}{12} - \left(-\frac{b}{3}\right)^2 \frac{bh}{2} = \frac{hb^3}{36}$$

$$J_{yz} = J_{y_T z_T} + \left(-\frac{h}{3}\right)\left(-\frac{b}{3}\right) S \quad \Rightarrow \quad J_{y_T z_T} = \frac{b^2h^2}{24} - \left(-\frac{h}{3}\right)\left(-\frac{b}{3}\right)\frac{bh}{2} = -\frac{b^2h^2}{72}$$

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