

$$g_1(x) = \frac{B}{2H} \cdot x$$

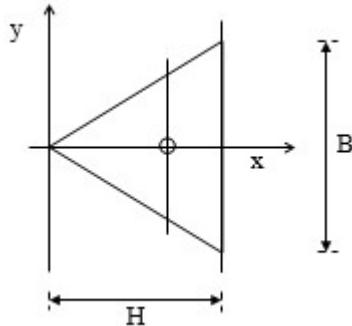
The upper side of the Triangle as function

$$g_2(x) = -\frac{B}{2H} \cdot x$$

The lower side of the Triangle as function

Moment of Area around the x-axis:

$$I_x = \int_0^H \int_{g_2(x)}^{g_1(x)} y^2 dy dx \quad I_x = \frac{B^3 \cdot H}{48}$$



Moment of Area around the y-axis:

$$I_y = \int_0^H \int_{g_2(x)}^{g_1(x)} x^2 dy dx \quad I_y = \frac{B \cdot H^3}{4}$$

$$x_s = \frac{2}{3} H \quad x\text{-position of the center of the triangle}$$

Moment of Area around the center-axis x_s :

$$I_{ys} = \int_0^H \int_{g_2(x)}^{g_1(x)} \left(x - \frac{2}{3} H \right)^2 dy dx \quad I_{ys} = \frac{B \cdot H^3}{36}$$

Moment of Area around the axis H :

$$I_{ys} = \int_0^H \int_{g_2(x)}^{g_1(x)} (x - H)^2 dy dx \quad I_{ys} = \frac{B \cdot H^3}{12}$$

Moments of Steiner:

If the triangle rotates around an axis which is larger than H , for example $x = W$, then we get for the Moment of Area:

$$I_{yH} = \int_0^H \int_{g_2(x)}^{g_1(x)} (x + W)^2 dy dx \quad I_{yH} = \frac{B \cdot H \cdot (3 \cdot H^2 + 8 \cdot H \cdot W + 6 \cdot W^2)}{12}$$

$$I_{yH} = I_{ys} + A \cdot \left(W + \frac{2}{3} H \right)^2 \quad I_{ys} = \frac{B \cdot H^3}{36} \quad A = \frac{1}{2} B \cdot H$$

$$I_{yH} = \frac{B \cdot H^3}{36} + \frac{1}{2} B \cdot H \cdot \left(W + \frac{2}{3} H \right)^2 \quad I_{yH} = \frac{B \cdot H \cdot (3 \cdot H^2 + 8 \cdot H \cdot W + 6 \cdot W^2)}{12}$$

The interesting thing here is, when integrating directly we don't need to take the Steiner-Moment into account because the center-rotations of the infinitesimal small stripes are the rotation itself!