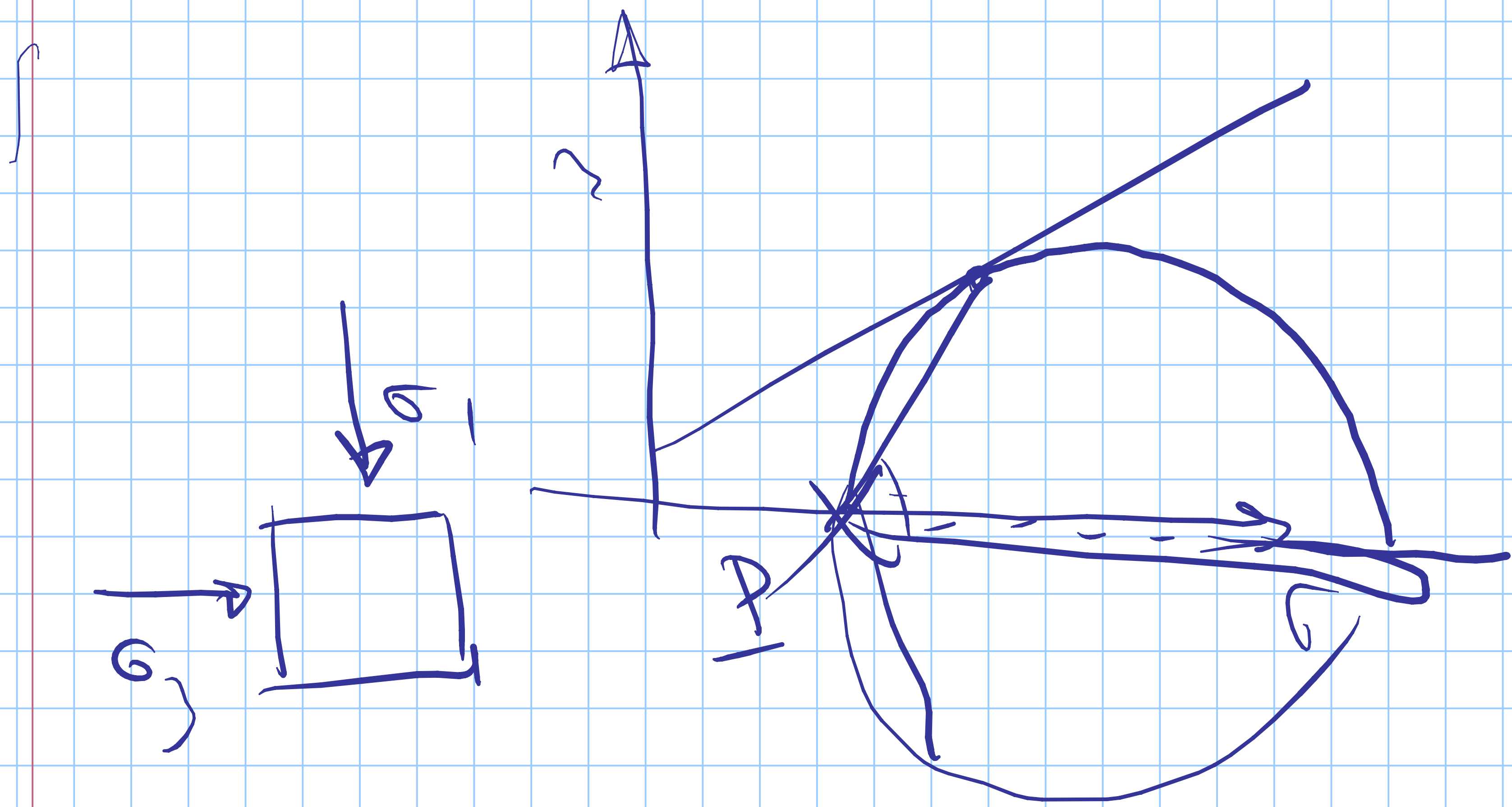
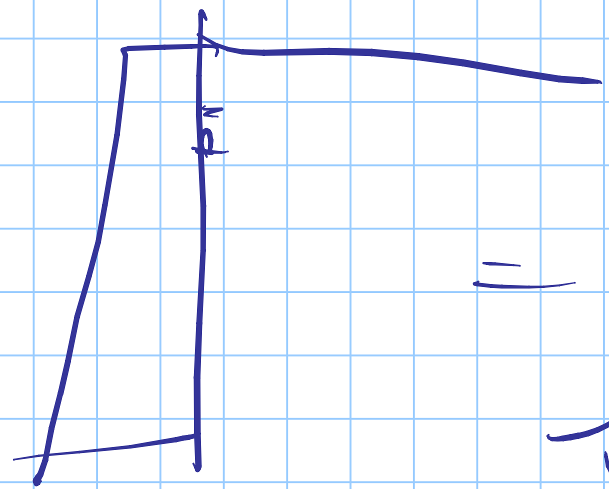
Titolo nota 08/03/2013



$$S = \int_0^H dF_z$$

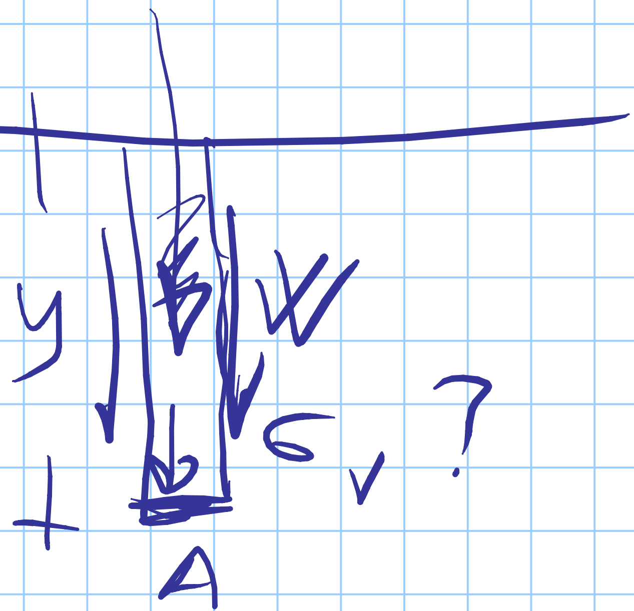


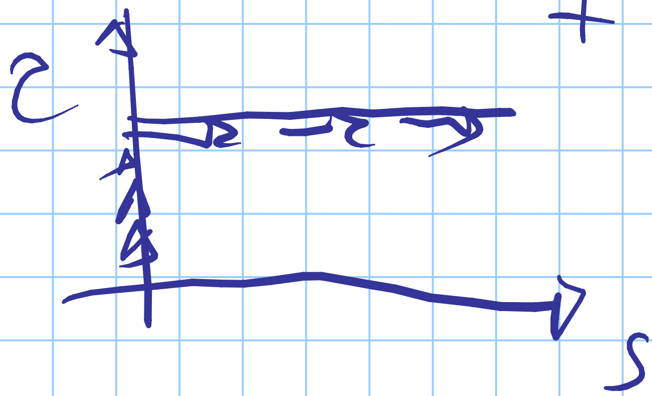
$$= \int_0^H \sigma\, dy$$

$$\varepsilon_h = 0$$

$$\varepsilon_h = \frac{1}{E}\left[\sigma_h' - \nu\left(\sigma_v + \sigma_h\right)\right] = 0$$

$$\sigma_h = \frac{\nu}{1-\nu}\sigma_v$$



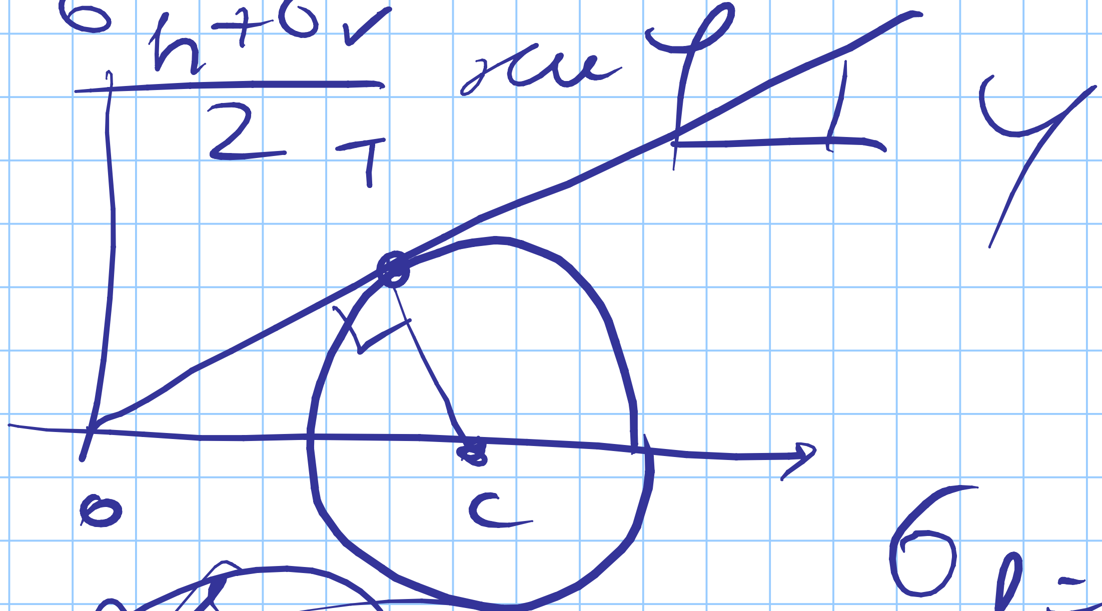


$$W = \gamma \cdot V$$

$$6_v = \frac{\gamma \cdot A \cdot y}{A}$$

$$TC = \overline{OC}\ \sin\varphi$$

$$\frac{\sigma_v - \sigma_h}{2} = \frac{\sigma_h + \sigma_v}{2}\sin\varphi$$

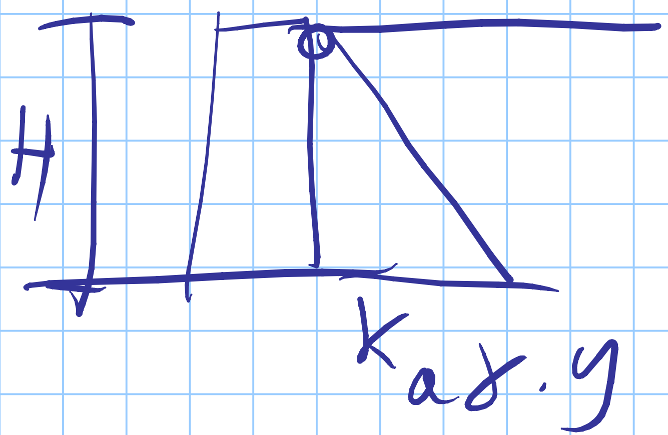


$$\sigma_h = k_a \cdot \sigma_v$$

$$\sigma_h = \left(\frac{1-\sin\varphi}{1+\sin\varphi}\right)\cdot\sigma_v$$

$$\sigma_h = K_a \sigma_v$$

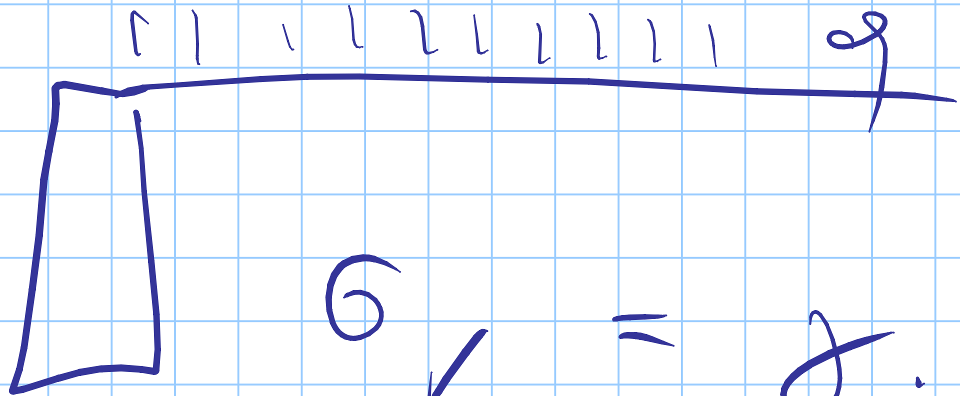
$$\sigma_h(y) = K_a \cdot \gamma \cdot y$$



$$S_a = \frac{1}{2} \gamma H^2 K_a$$

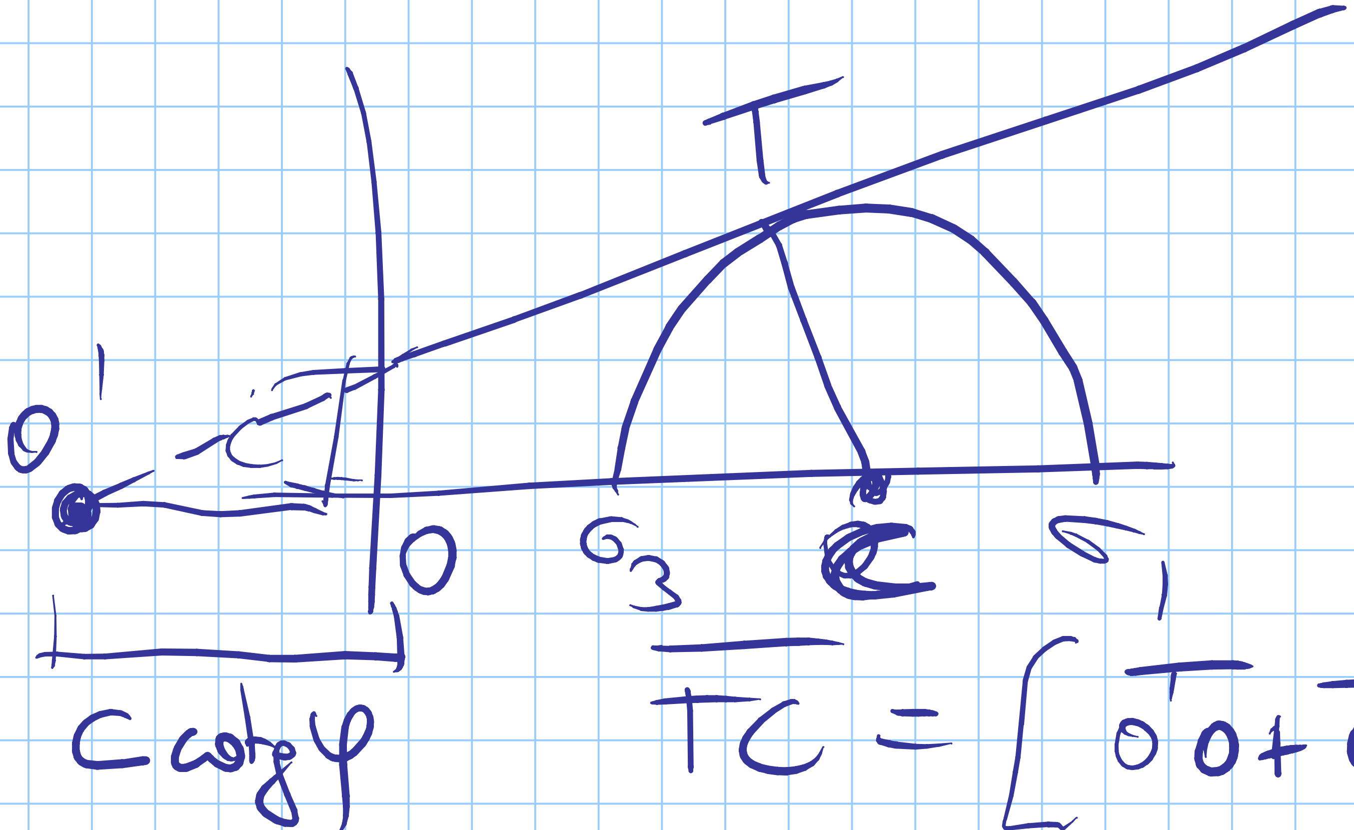
$$S = \int_0^{H} k_a(\gamma y + q)\,dy = \frac{1}{2}\gamma H^2 k_a + qHk_a$$

$$\sigma_v = \gamma \cdot y$$



$$\sigma_v = \gamma \cdot y + q$$

$$S_a = \frac{1}{2}\gamma H^2 k_a + q H k_a$$



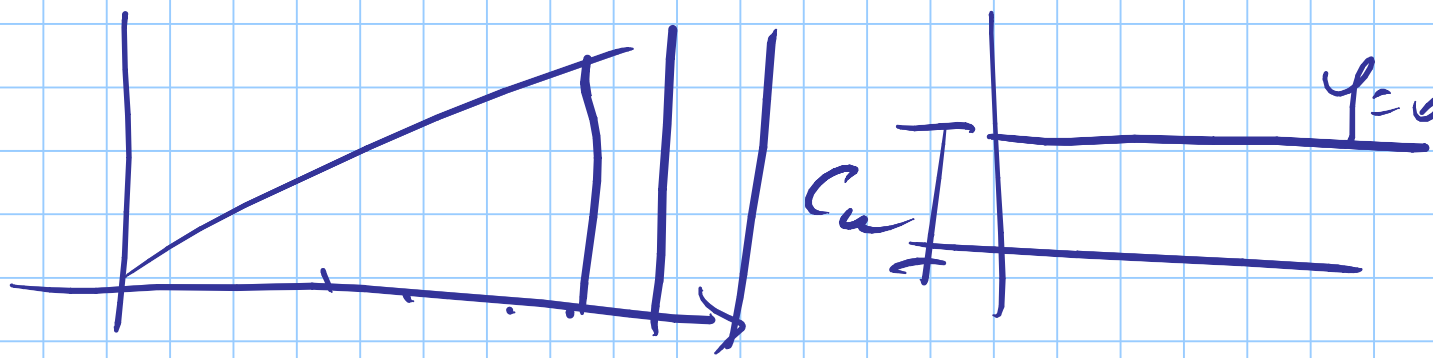
$$\overline{TC} = \left[\overline{O'O} + \overline{OC}\right] \sin\varphi$$

$$TC = \left(c \cos\varphi + \frac{\sigma_1 + \sigma_3}{2}\right) \sin\varphi$$

$$\frac{\sigma_1 - \sigma_3}{2}$$

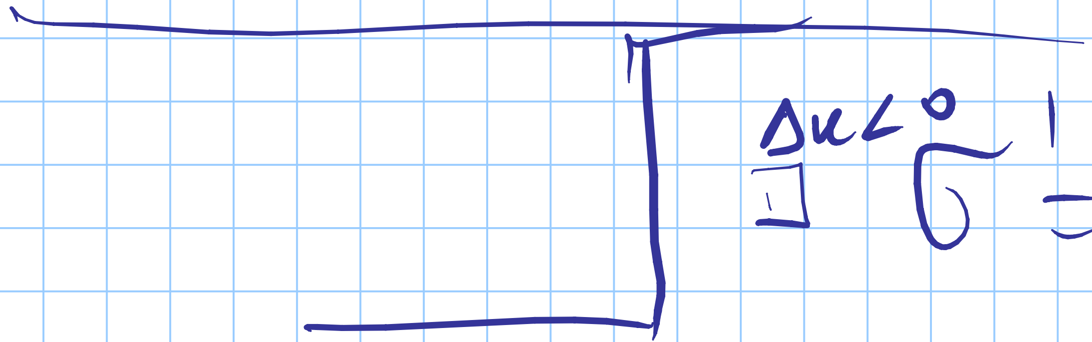
$$\sigma_h = \frac{1-\operatorname{sen}\varphi}{1+\operatorname{sen}\varphi}\,\sigma_v - 2c\sqrt{\frac{1-\operatorname{sen}\varphi}{1+\operatorname{sen}\varphi}}$$

$$\sigma_h = k_a\,\sigma_v - 2c\sqrt{k_a}$$



$$\boxed{\begin{aligned} \sigma' &= \sigma - u \\ \Delta\sigma' &= \Delta\sigma - \Delta u \end{aligned}}$$

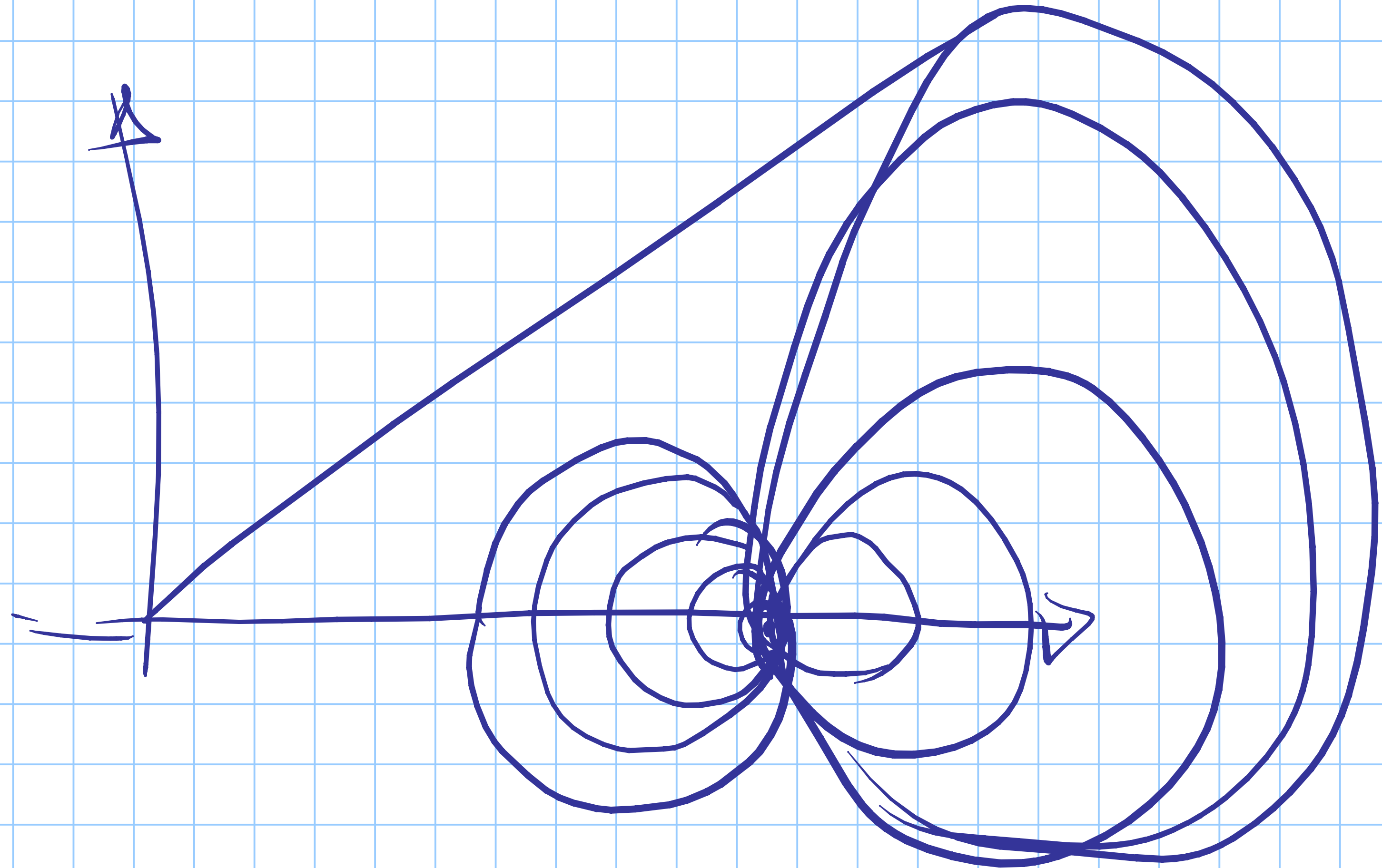
$$H_{lim} = \frac{4c}{\gamma\sqrt{K_a}} \rightarrow \frac{4c_u}{\gamma}$$



$\Delta u < 0$

$$\sigma' = \sigma - u$$

加



$$\sigma_h = K_p \sigma_v$$

$$K_p = \frac{1+\sin\varphi}{1-\sin\varphi}$$

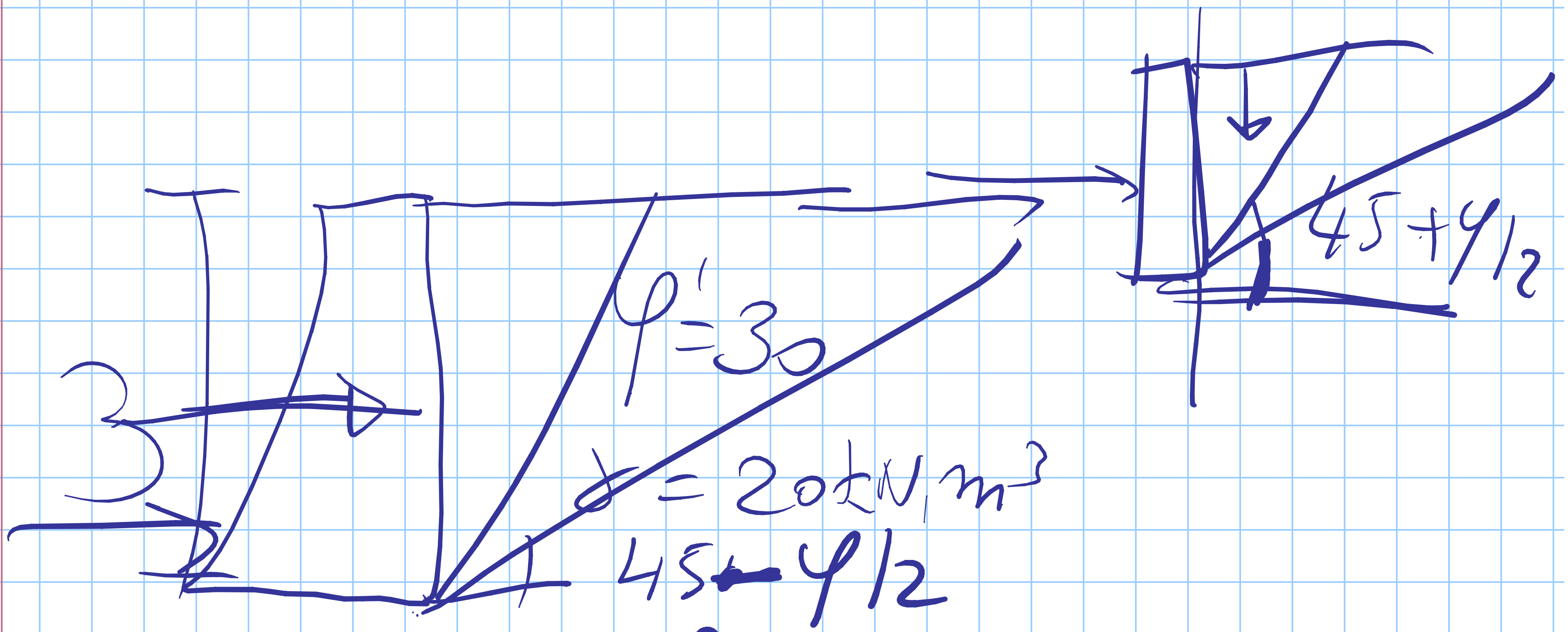
$$\varphi = 30^\circ$$

$$K_a = \frac{1}{3} \quad ; \quad K_p = 3$$

$\varphi \uparrow \qquad K_a \downarrow \qquad K_p$

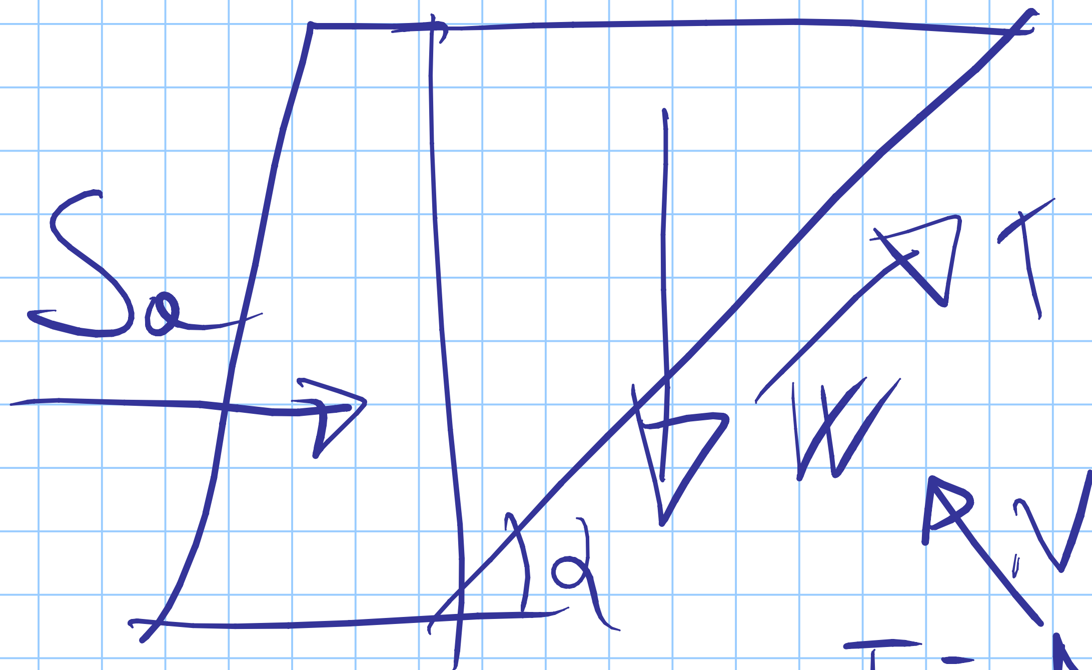
$$\sigma_h = \gamma y K_p + q \cancel{H} K_p + 2c \cancel{H} \sqrt{K_p}$$

$$S_p = \frac{1}{2} \gamma H^2 K_p + q H K_p + 2cH \sqrt{K_p}$$



$$S_a = \frac{1}{2}\gamma H^2 k_a = \frac{20}{2}\, 9 \cdot \frac{1}{3} = 30\, kN/m$$

$$W = \frac{1}{2}\gamma H^2 \cot g\, \alpha$$



$$T = N\, tg\, \varphi$$

$$T = N\, tg\, \varphi$$

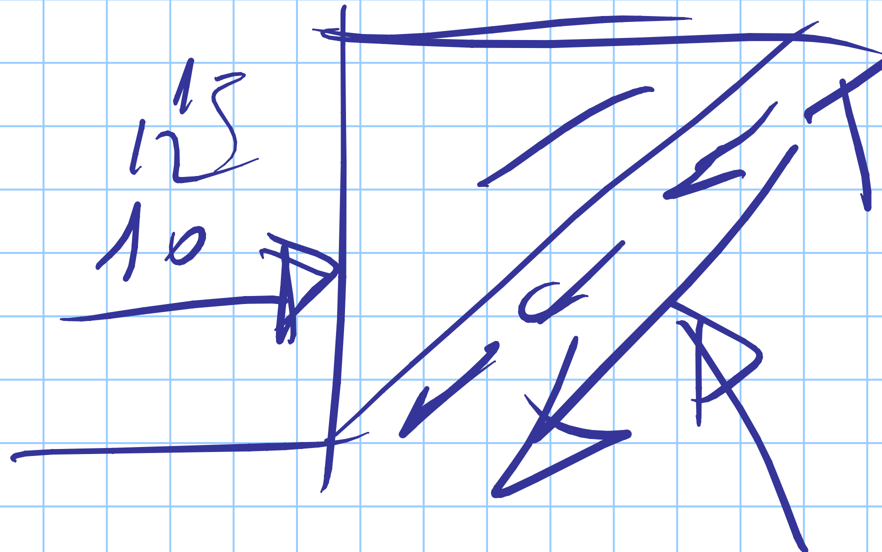
$$S_o + T\cos\alpha - N\sin\alpha = 0$$

$$W - T\sin\alpha - N\cos\alpha = 0$$

$$S_a = \frac{1}{2}\gamma H^2 \cot\rho \cdot \operatorname{tg}(\alpha-\varphi)$$

$$\frac{dS_a}{d\alpha} \Rightarrow = 0 \qquad \alpha = 45° + \varphi/2$$

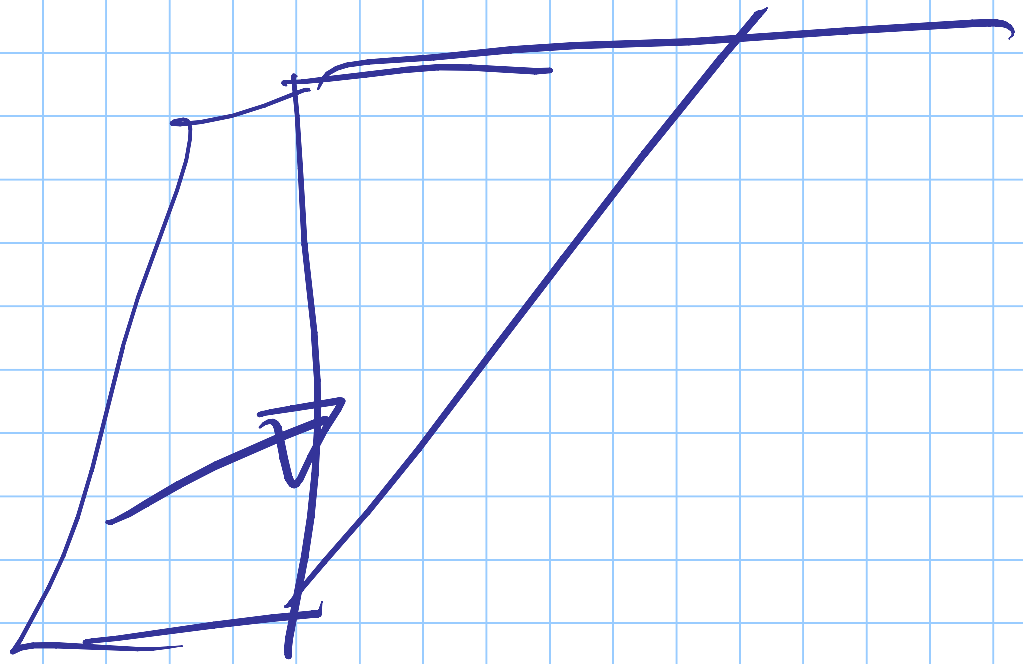
$k \quad K_a = \operatorname{tg}^2(45° - \varphi/2)$

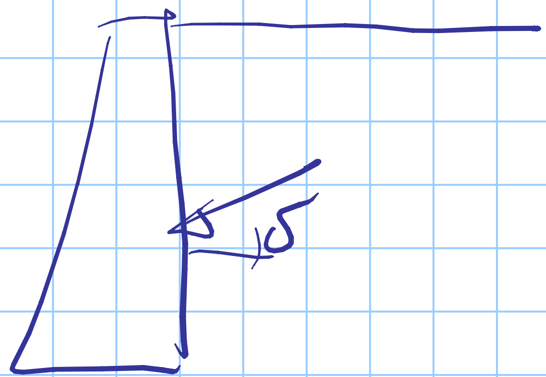


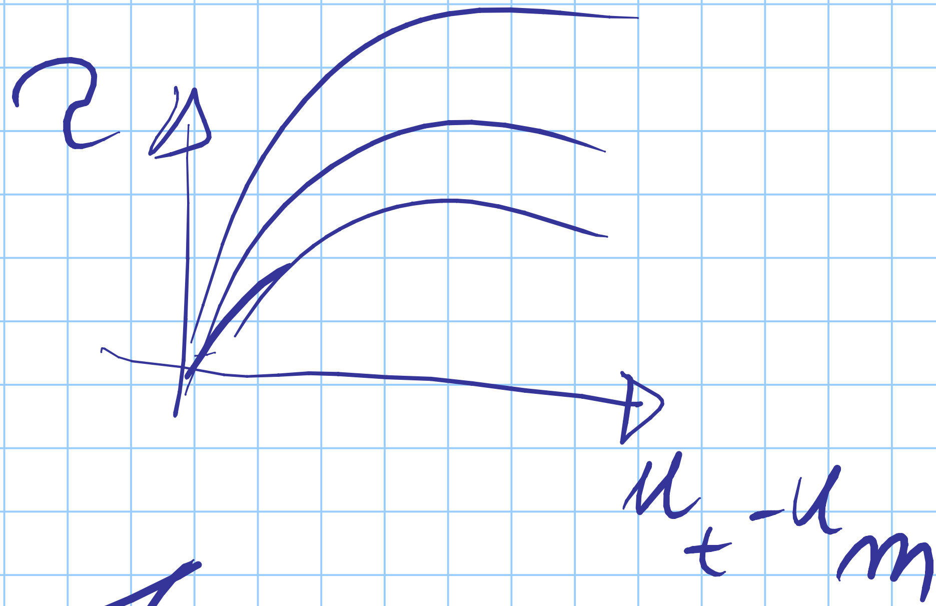
$$T = N\,tg\,\varphi$$

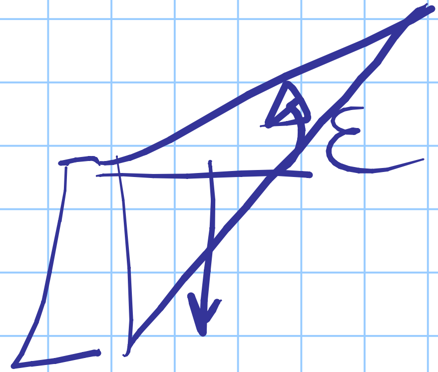
$$k_p = tg^2(45^\circ + \varphi/2)$$

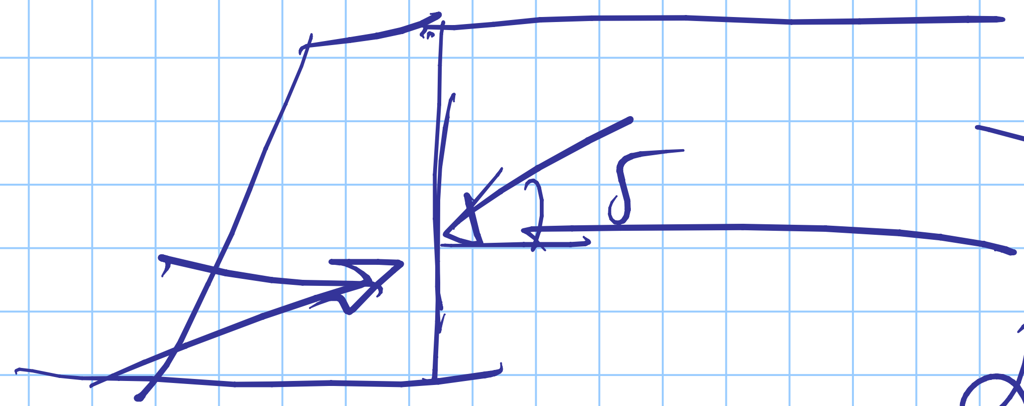
$$S_p = \frac{1}{2}\gamma H^2 k_p =$$

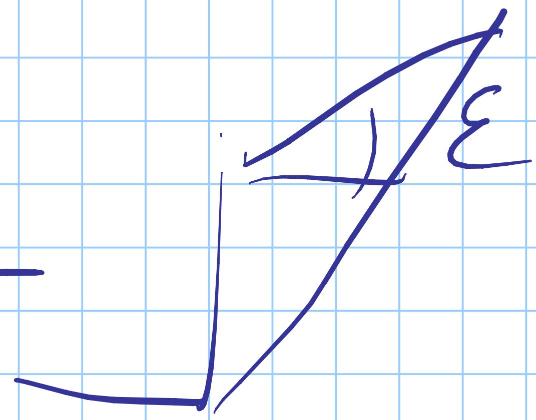



δ


u_t - u_m


ε

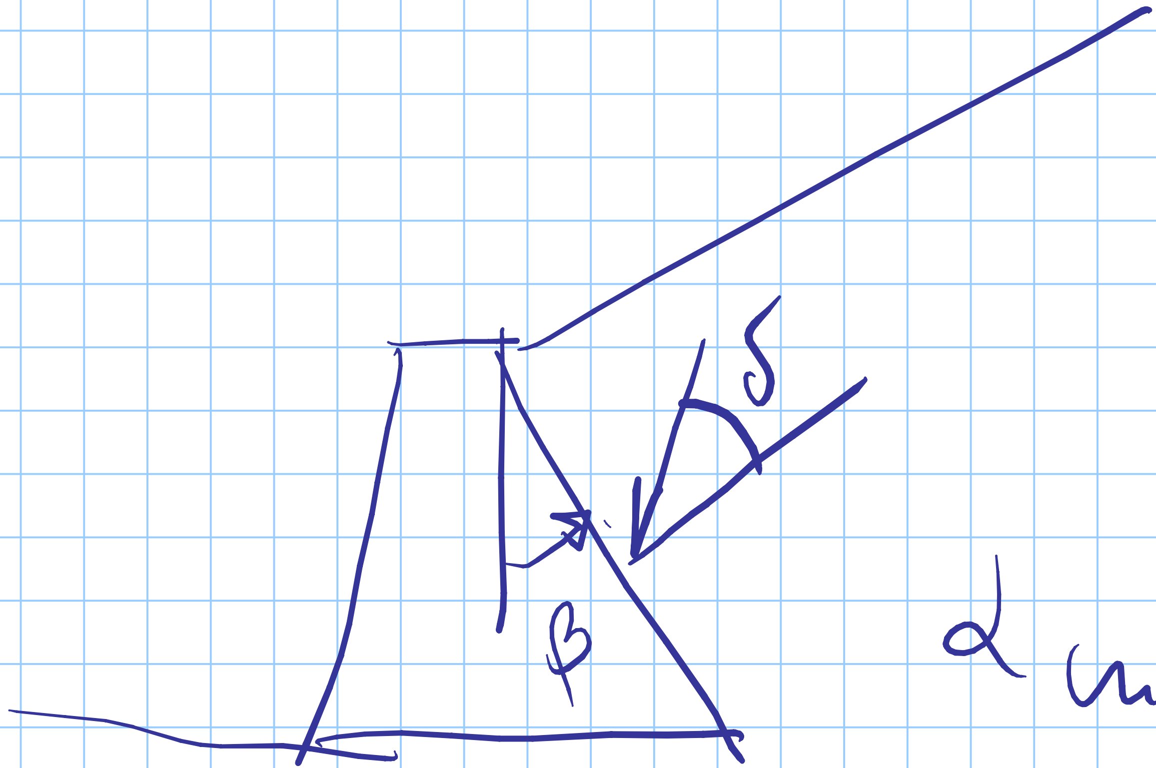




α_{crit}

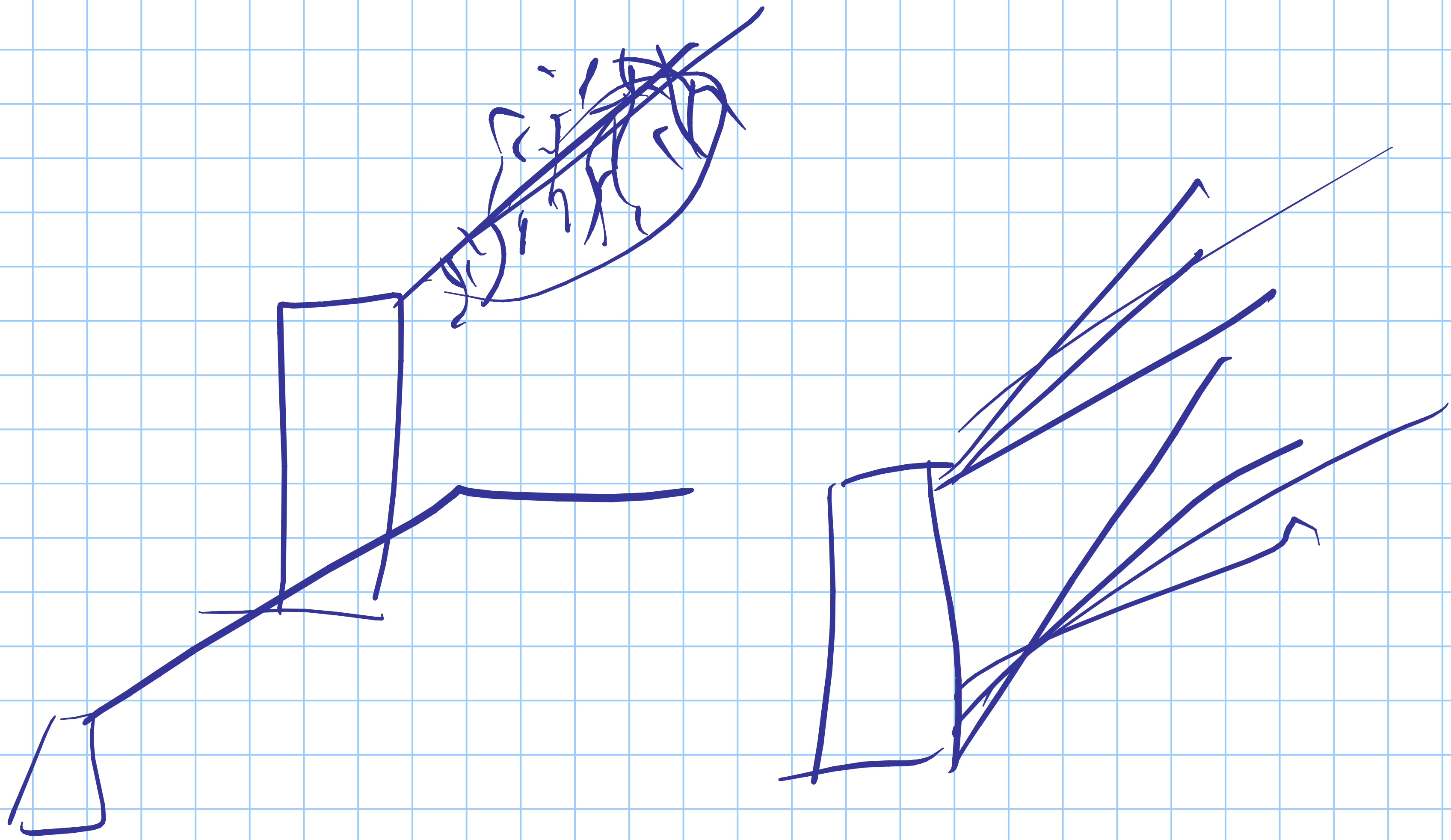
$S_a \cos\delta + \dots$

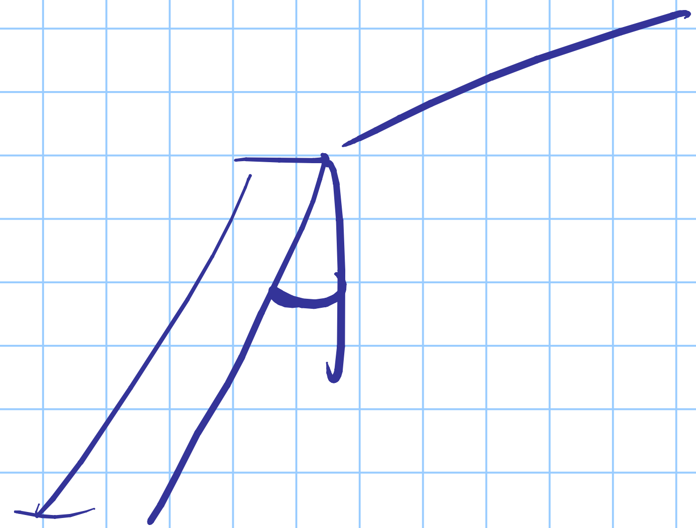
$S_a \sin\delta + \dots$

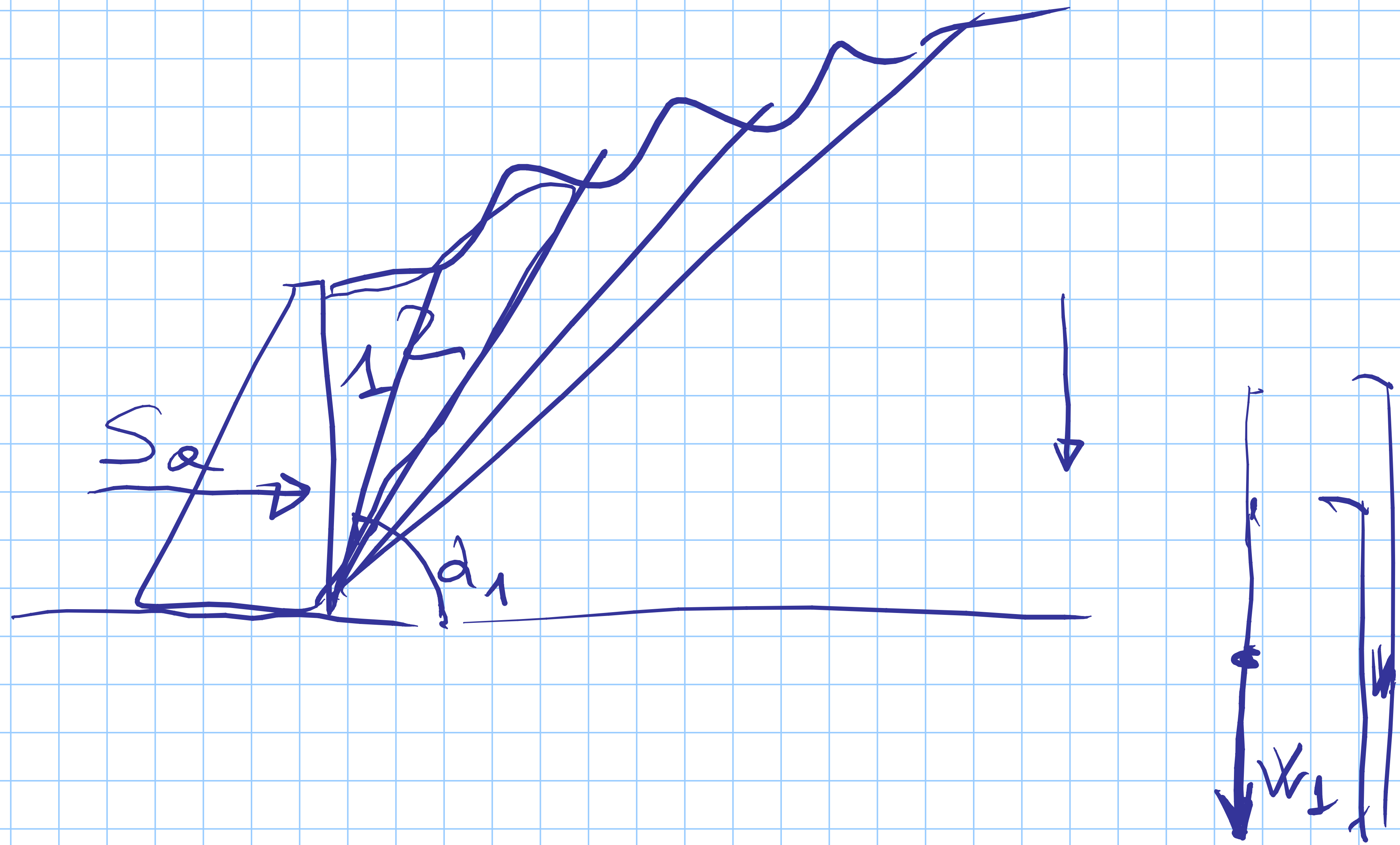


α uit € $f(\varphi, \delta, \varepsilon, \beta)$

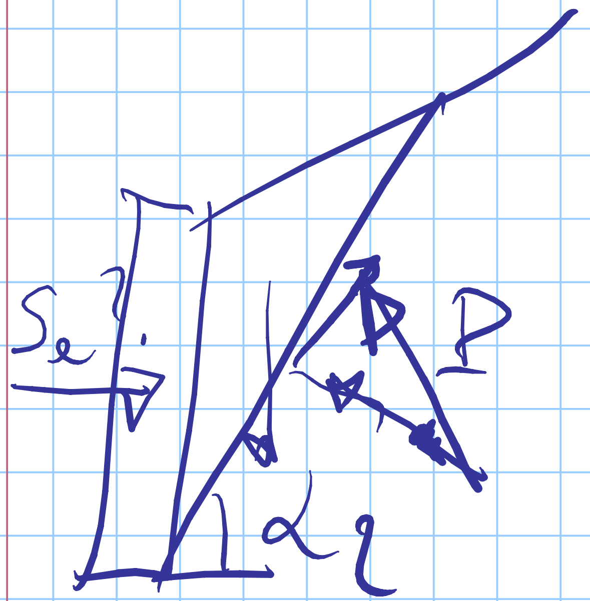
$K_a = f(\varphi, \delta, \varepsilon, \beta)$

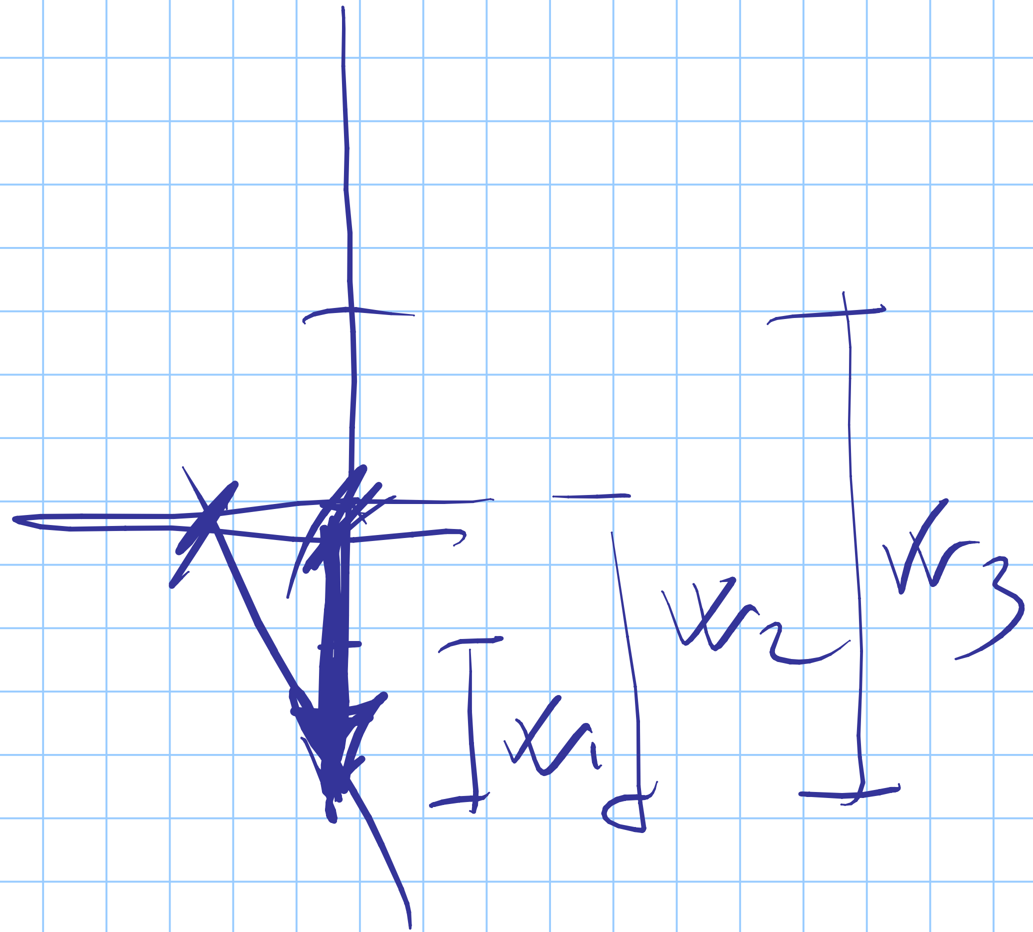


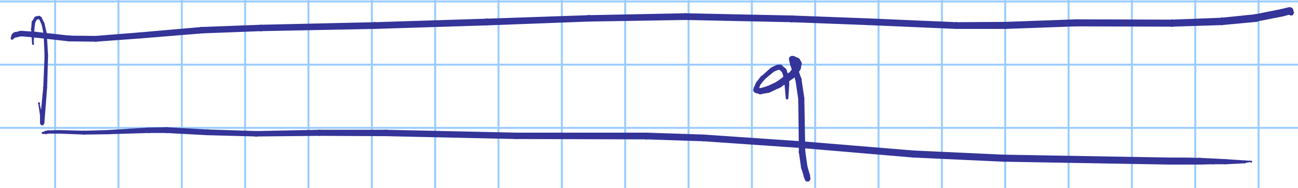


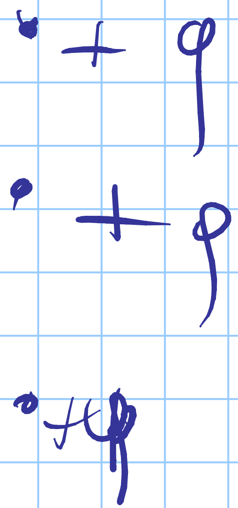


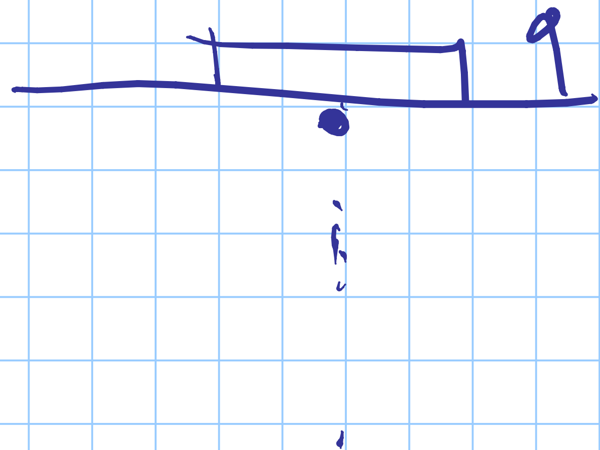
Sa
1
2
α1
W1
W

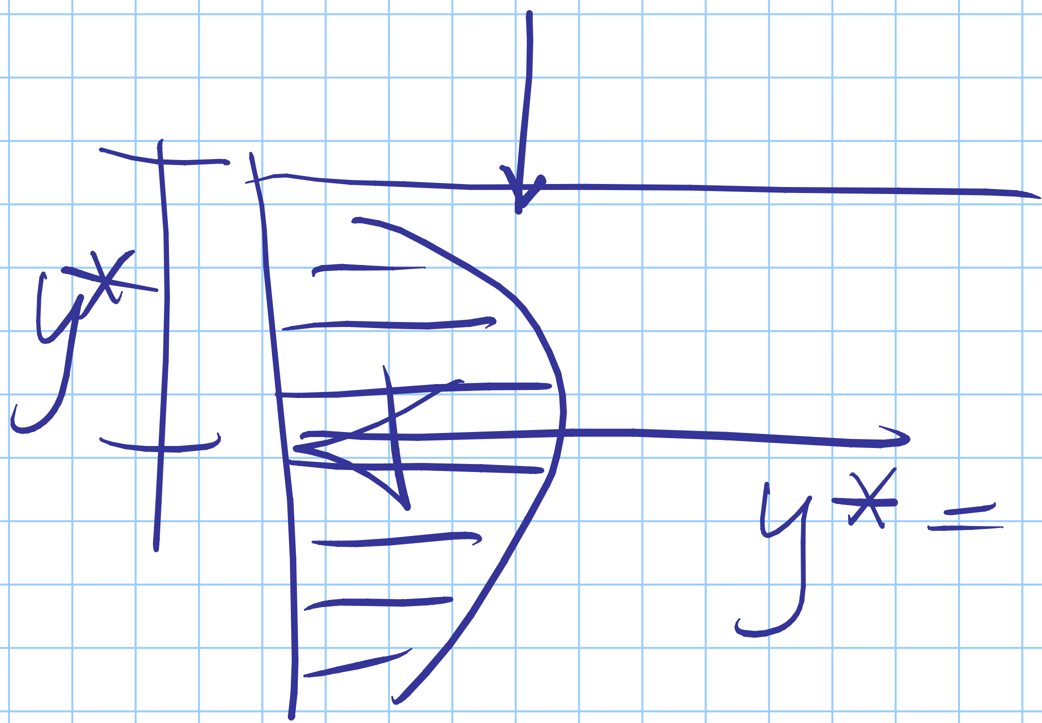

Se
P
α







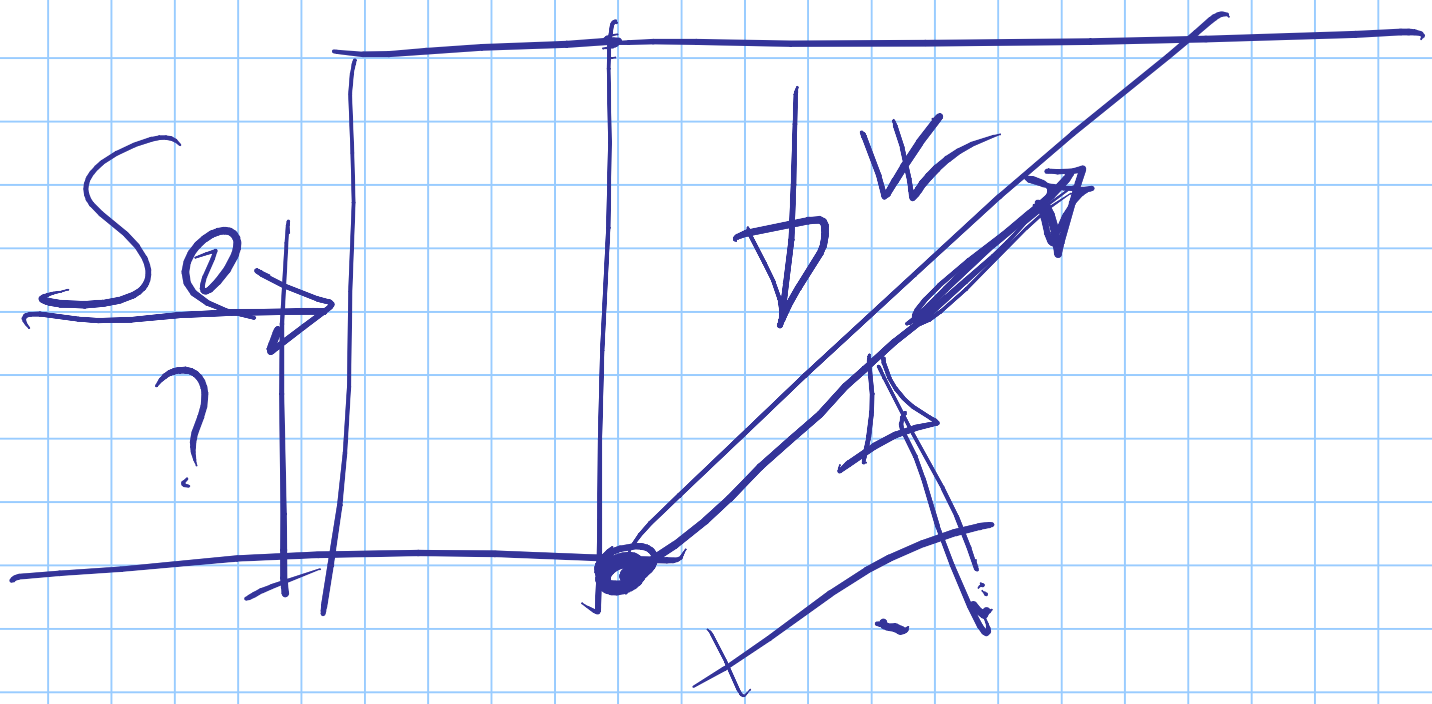




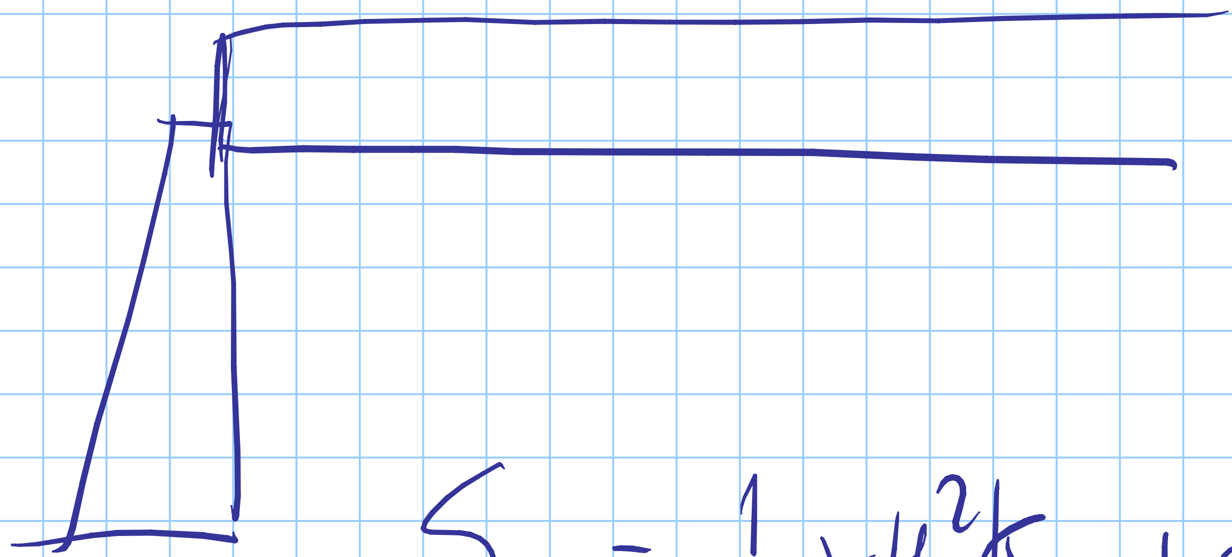
$$y^* = \frac{\int \sigma_h \cdot dy \cdot y}{\int \sigma_h \cdot dy}$$

$$\Sigma F_h = 0$$

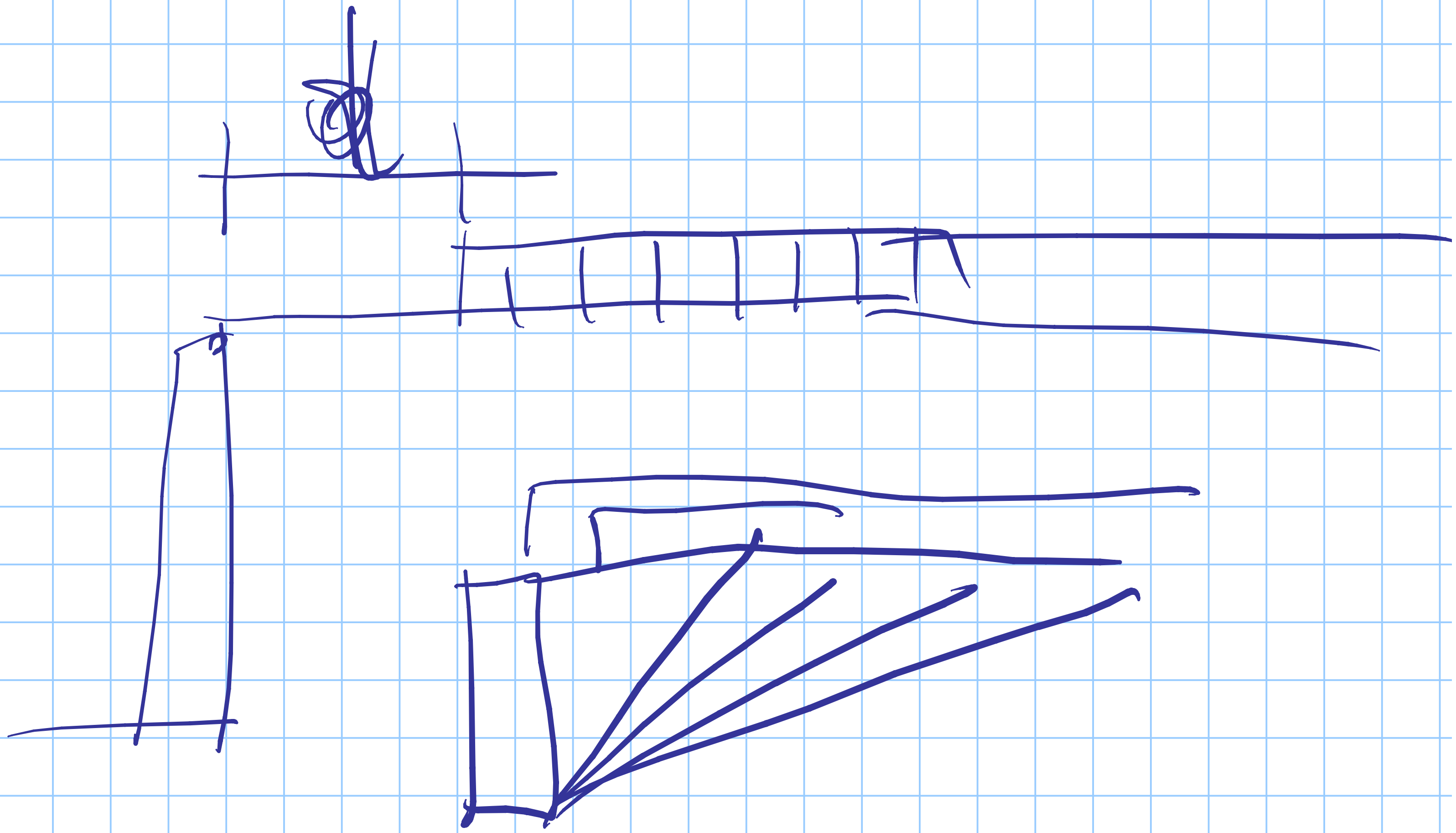
$$\Sigma F_v = 0$$

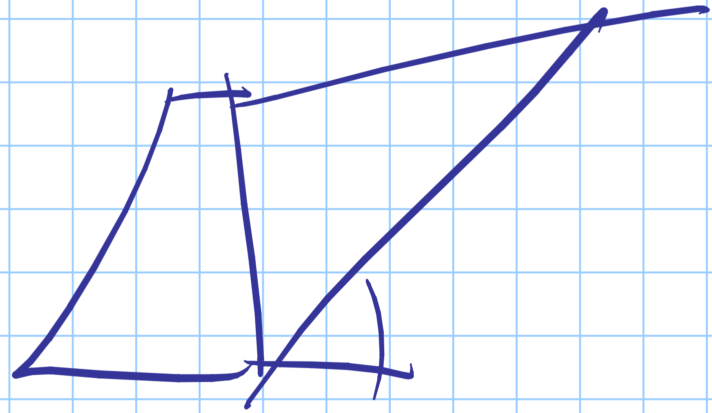

So
?

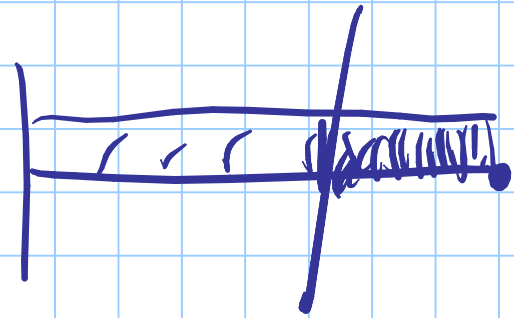
$K_e \gamma = K_e q$



$$S_e = \frac{1}{2}\gamma H^2 K_e + q H K_e$$



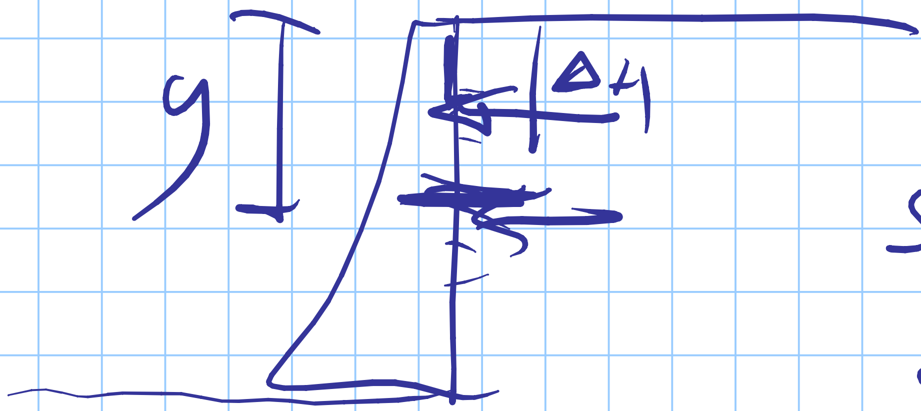




$$S_a = \frac{1}{2}\gamma H^2 \operatorname{cotg}\alpha \operatorname{tg}(\underline{\alpha}-\varphi)$$

$\Gamma(y) = \frac{1}{2}\gamma y^2 k_a$

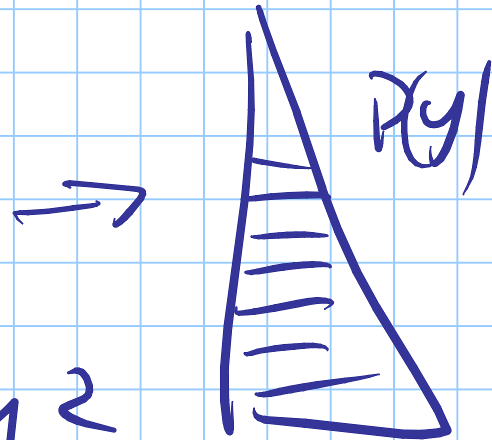
$S = \frac{1}{2}\gamma y^2 k_a$



$S_a = \frac{1}{2}\gamma \Delta H^2 k_a$

$S_a = \frac{1}{2}\gamma 4\Delta H^2 k_a$

$$P(y) = \frac{1}{2}\gamma K_a y^2$$



$$P(y) = 2 \cdot \frac{1}{2}\gamma K_a y = \gamma K_a y$$

$$\sigma' = \frac{\sum P'_i}{A} \qquad \sigma' = \frac{N}{A}$$

$$\boxed{\sigma = \sigma' + u}$$

$$\boxed{\underline{\sigma}' = \sigma - u}$$

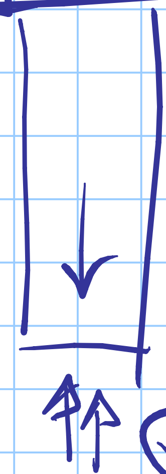
$$N = \sum P'_i$$

P'_i

Se $S_r = 0 \Rightarrow \gamma_d = G_s(1-n)$

$S_r = 1$ $\gamma_{sat} = G(1-n) + \gamma_w n$

$S_r = 1$



σ

$\sigma_v = \gamma_{sat} \cdot y$

$S_r = \dfrac{V_w}{V_v}$

$\gamma_{sat} = G_s(1-n) + \gamma_w \cdot S_r \cdot n$

$$\sigma_v = \gamma_{sat} \cdot y$$

$$u = \gamma_w \cdot y$$

$$\sigma_H = \sigma'_H + u$$

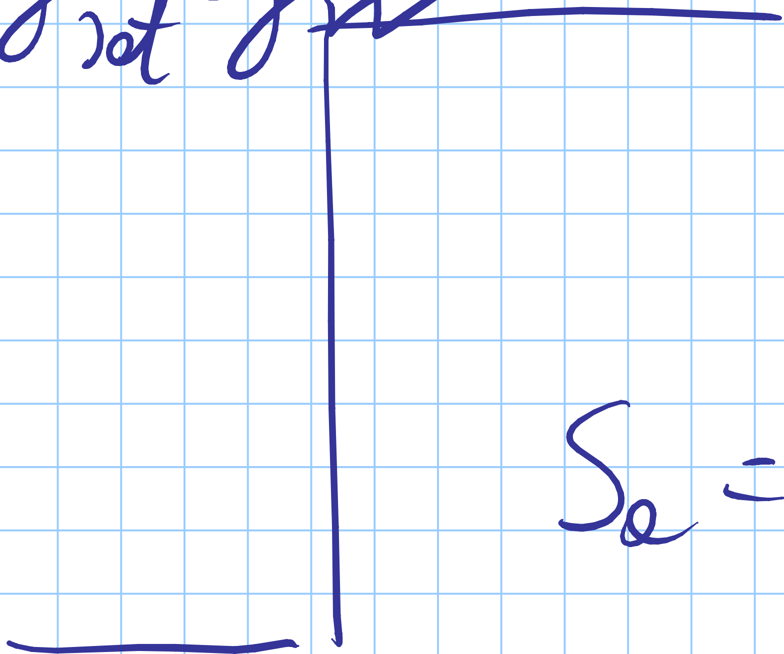
$$= K_0 \gamma' \cdot y + \gamma_w \cdot y$$

$$\sigma' = \gamma_{sat}\, y - \gamma_w \cdot y = \gamma' \cdot y$$

$$\sigma'_H = K_a \cdot \sigma'_v$$

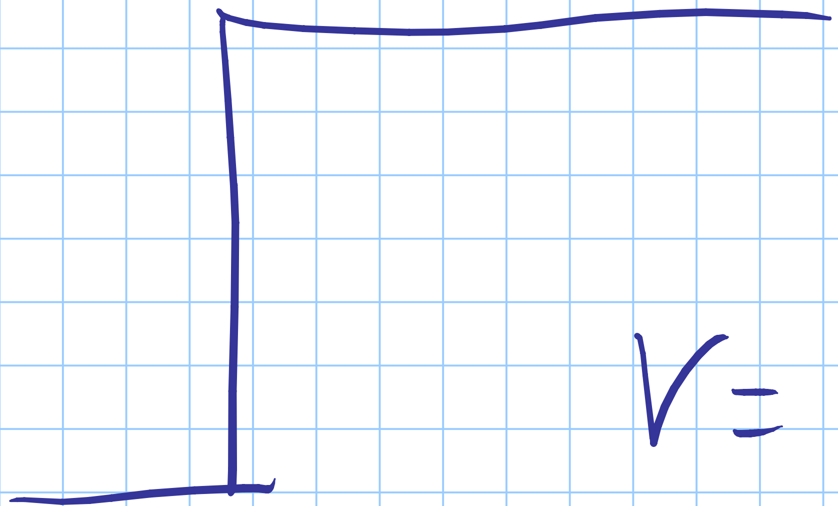
$$S_a = \frac{1}{2}\gamma_{sol} H^2 k_a$$

$$\gamma' = \gamma_{sat} - \gamma_w$$



$$S_a = (W_r - U\cos\alpha)\,\mathrm{tg}(\alpha - \varphi)$$

$$S_a = \frac{1}{2}\gamma' H^2 k_a + \frac{1}{2}\gamma_w H^2$$



$$h = z + u/\gamma_w$$

$$v = -K \cdot i$$

$$h = z + u/\gamma_w + \frac{v^2}{2g}$$

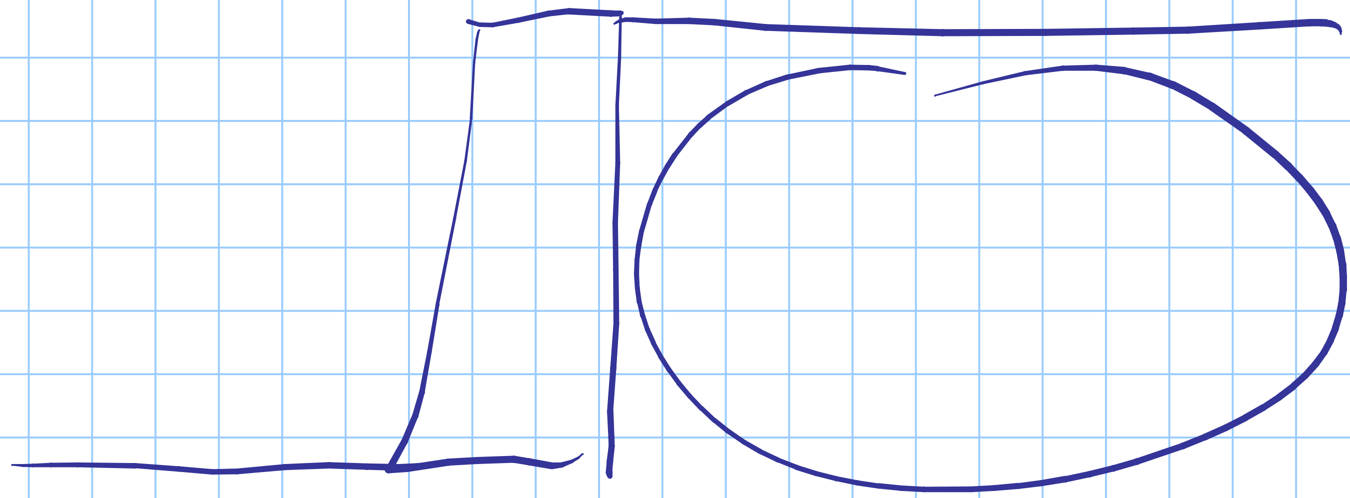
$$\frac{10^{-8}}{2000}$$

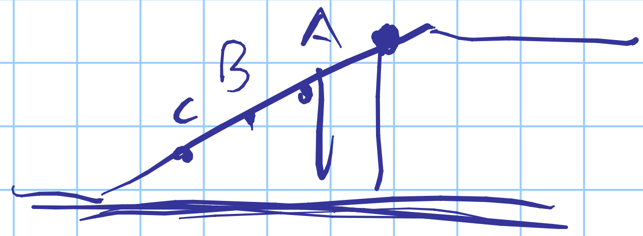
$10\,m + 5..$

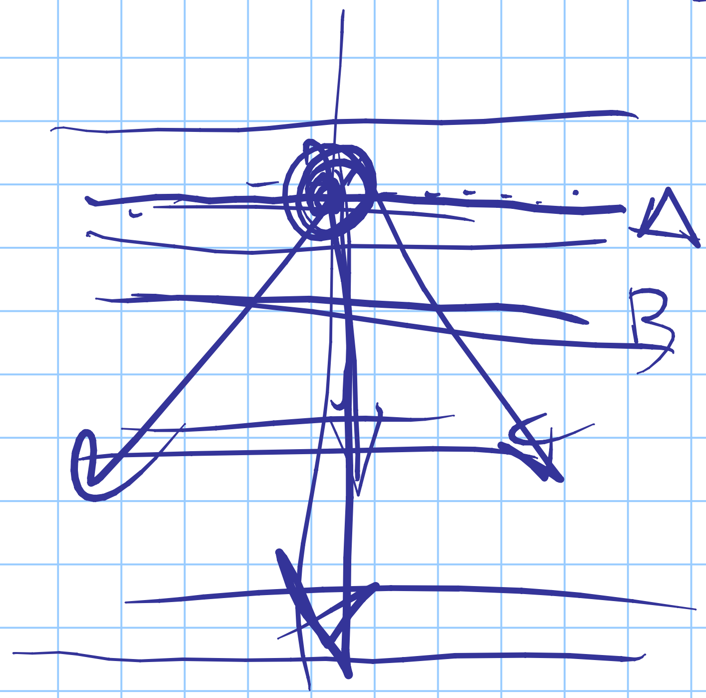
$$h(x, y)$$

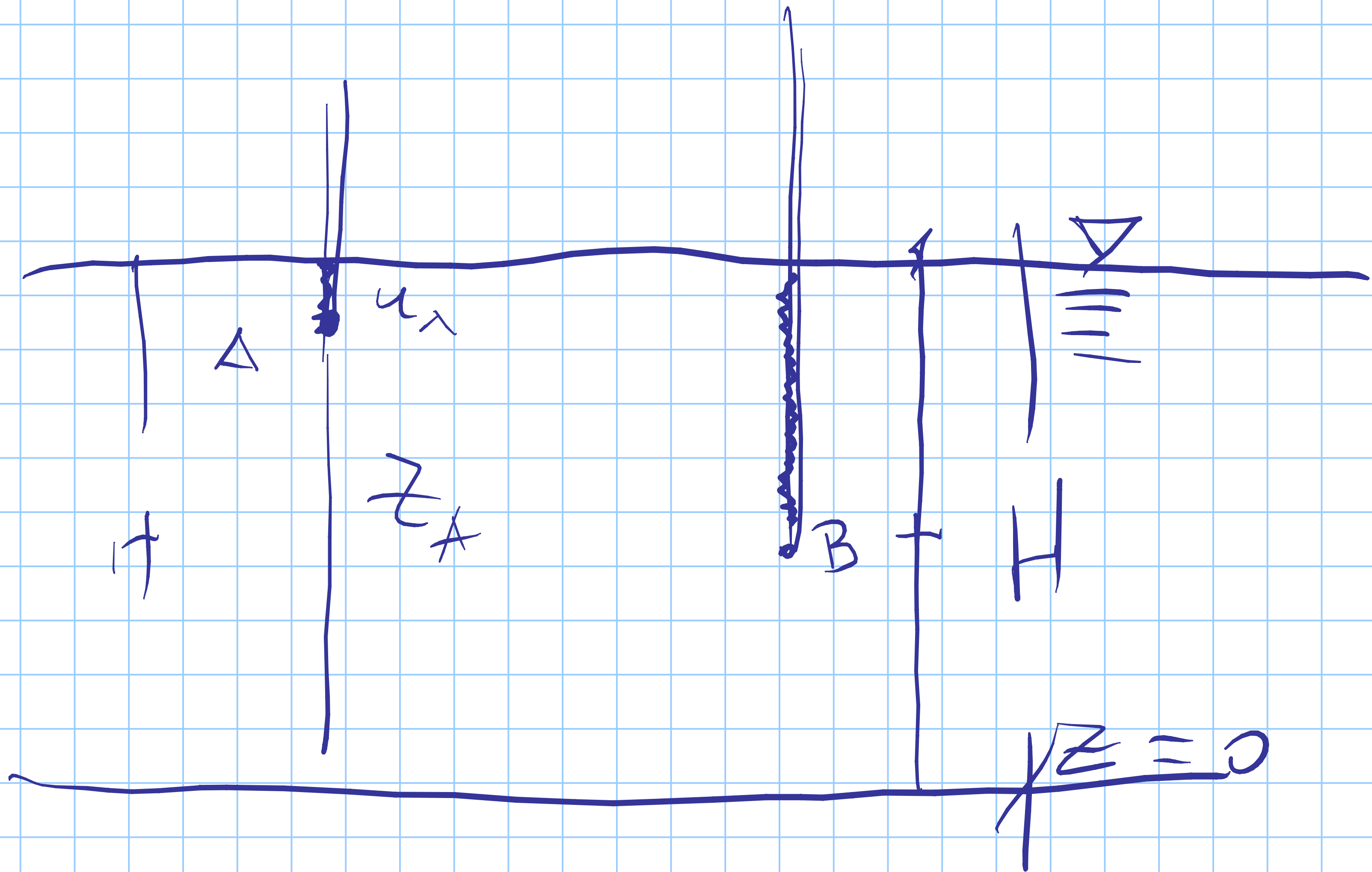
$$h(x,y) = u / \gamma_w + z$$

$$\frac{u}{\gamma_w} = h - z$$




C
B
A

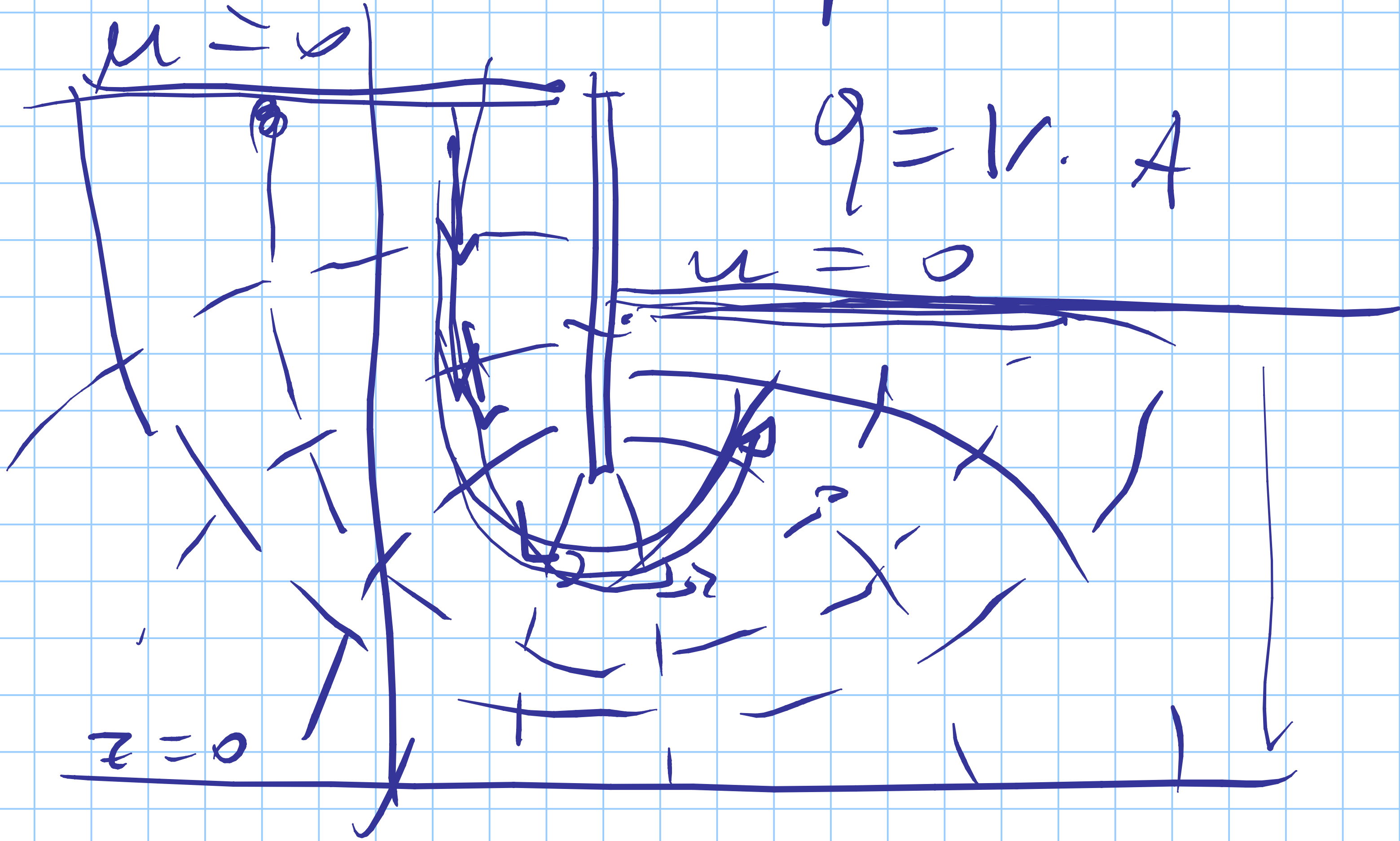

A
B

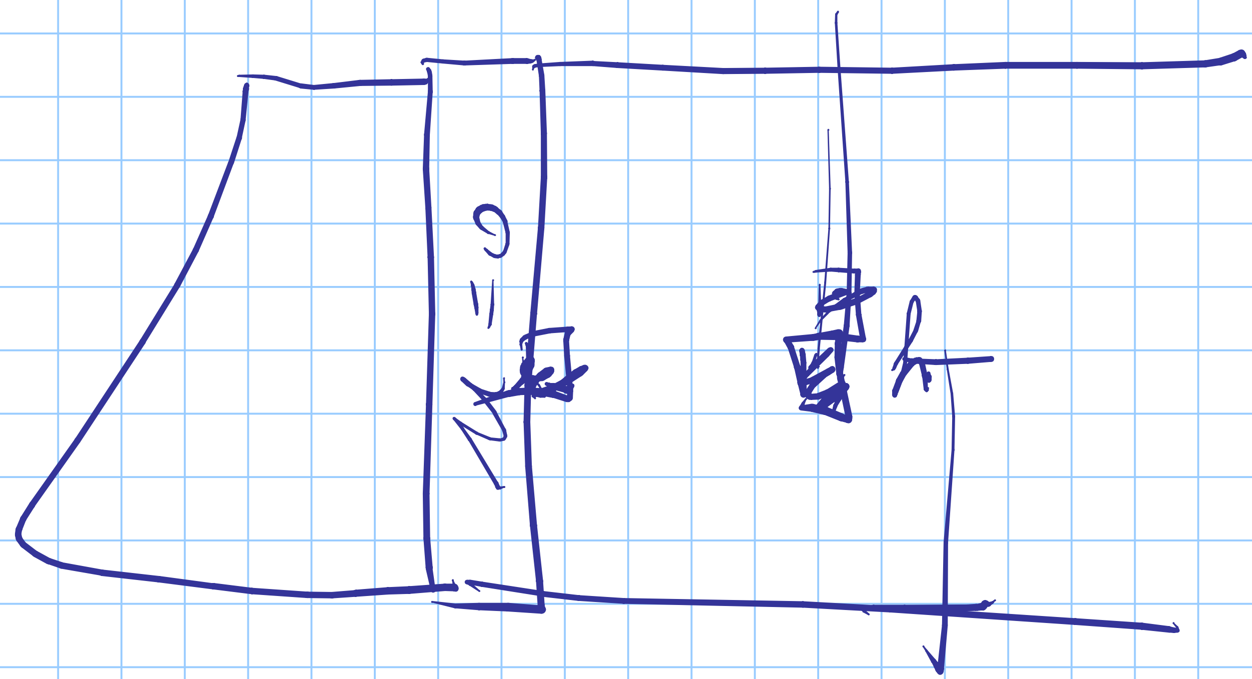


A
u_A
H
z_A
B
H
$z = 0$

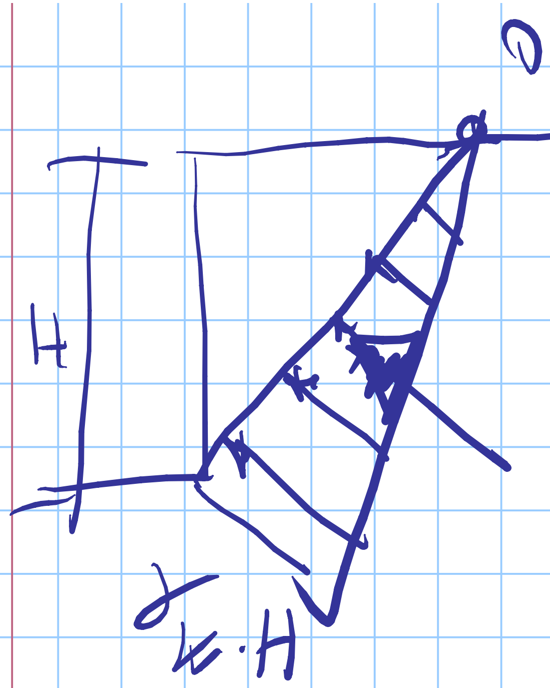
$$v = k \cdot i$$

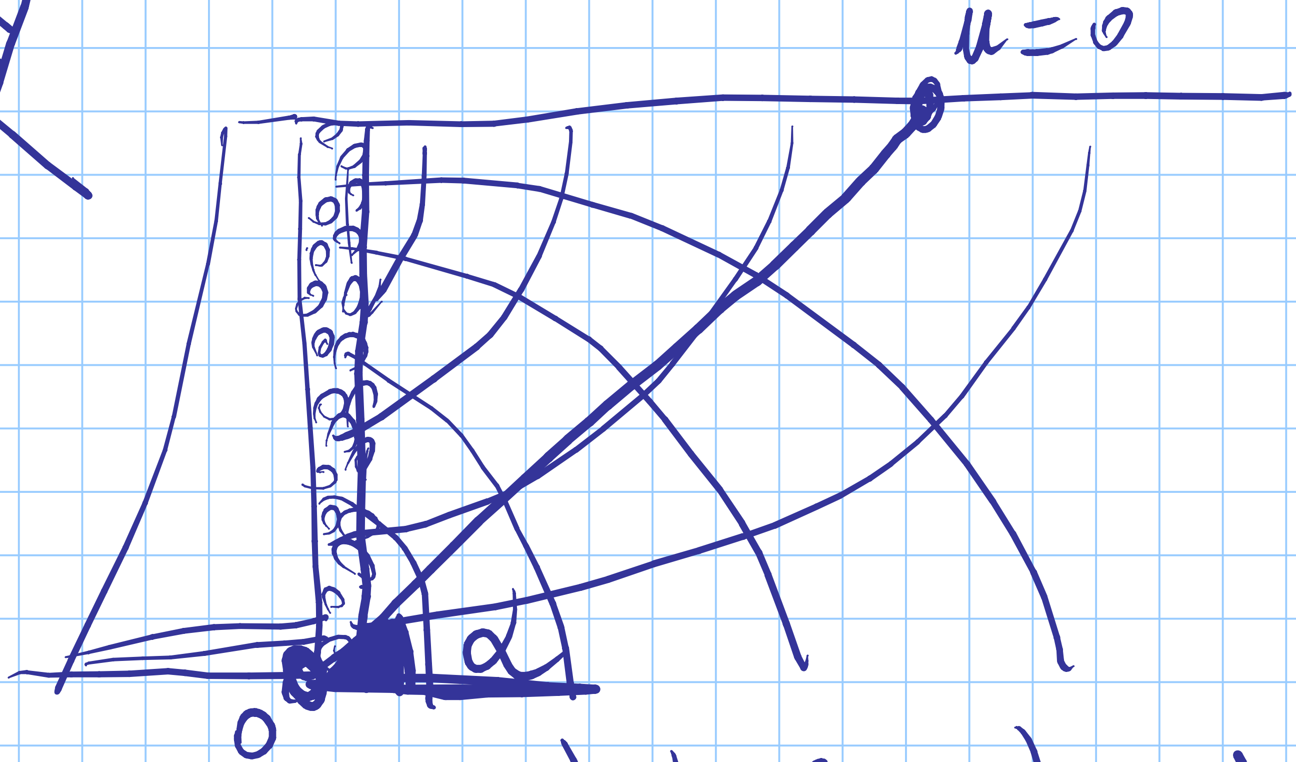
$$q = v \cdot A$$





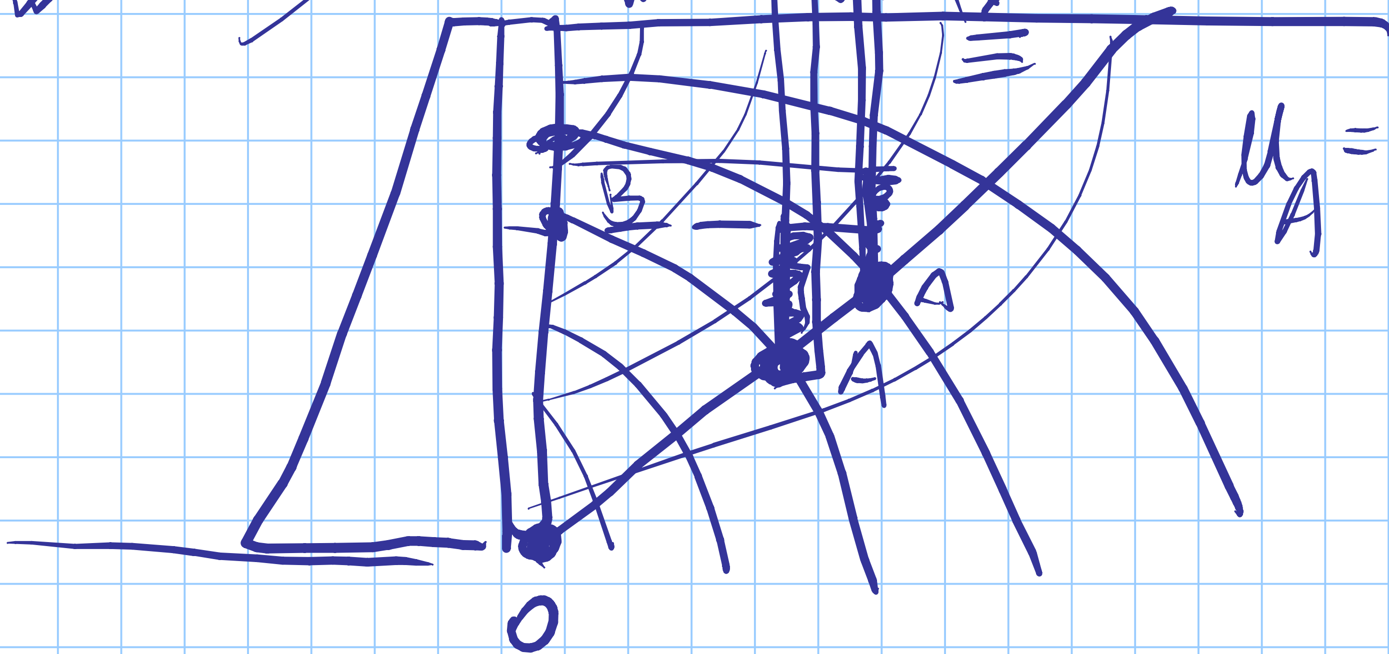
$$U = \frac{1}{2} \gamma_w H^2 / \sin\alpha$$





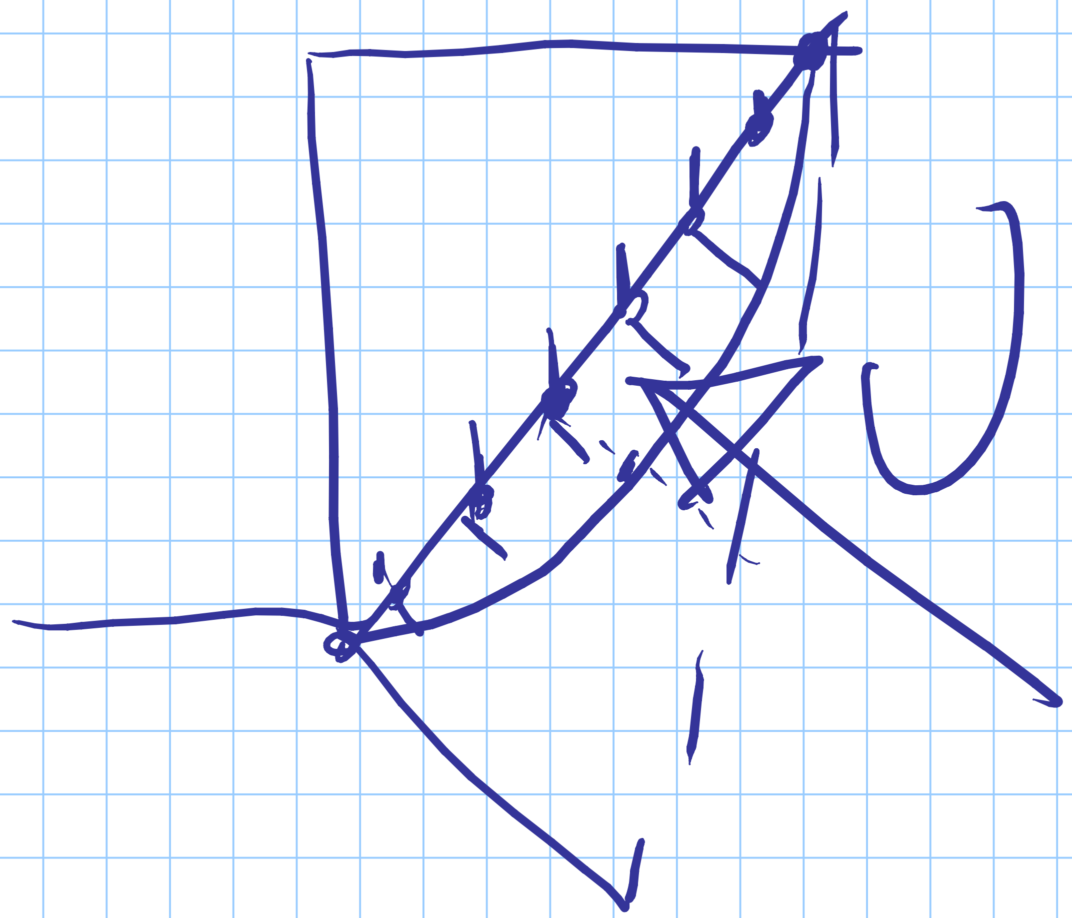
$$S_a = (W - \underline{U} \cos\alpha) \cdot tg(\alpha - \varphi) + \underline{U} \sin\alpha$$

$$\frac{u_A}{\gamma_w} = \cancel{\frac{u_B}{\gamma_w}} + z_B - z_A$$

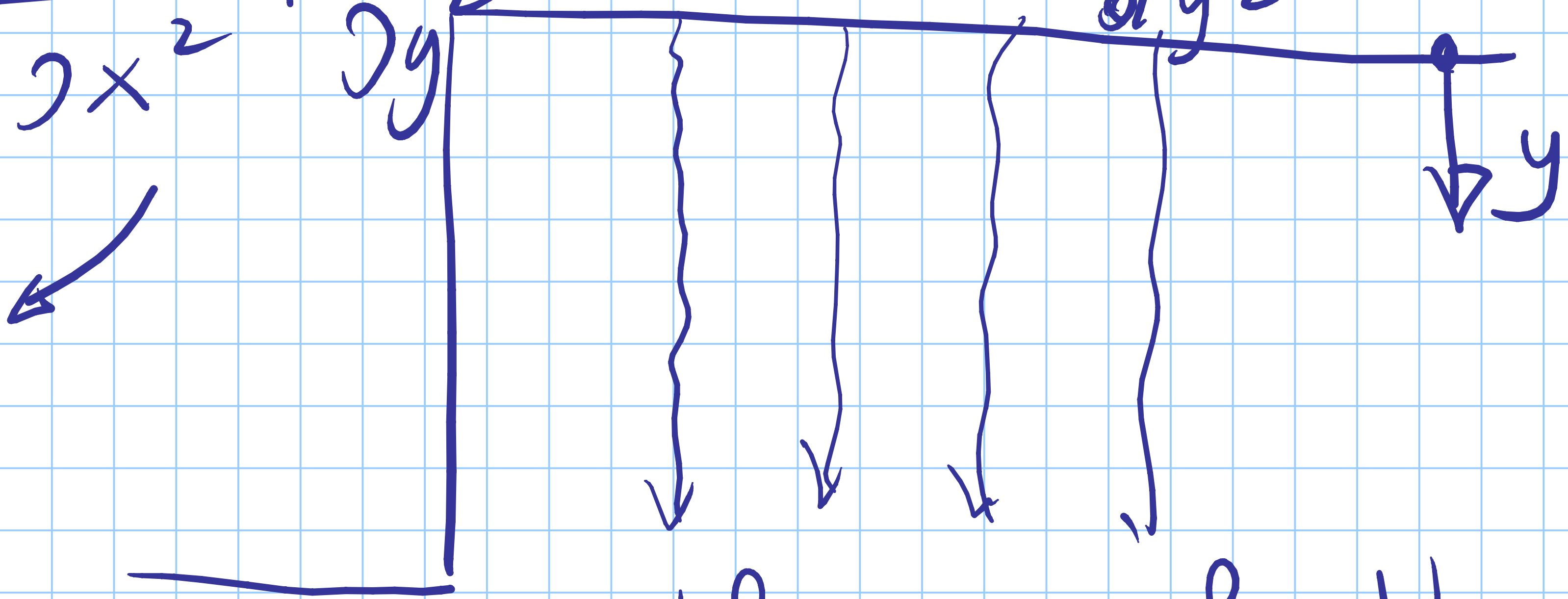


$$u_A = \gamma_w \left(z_B - z_A\right)$$

$$h_A = h_B \Rightarrow \frac{u_A}{\gamma_w} + z_A = \frac{u_B}{\gamma_w} + z_B$$



$$\frac{\partial^2 h}{\partial x^2} + \frac{\partial^2 h}{\partial y^2} = 0 \Rightarrow \frac{d^2 h}{dy^2} = 0$$

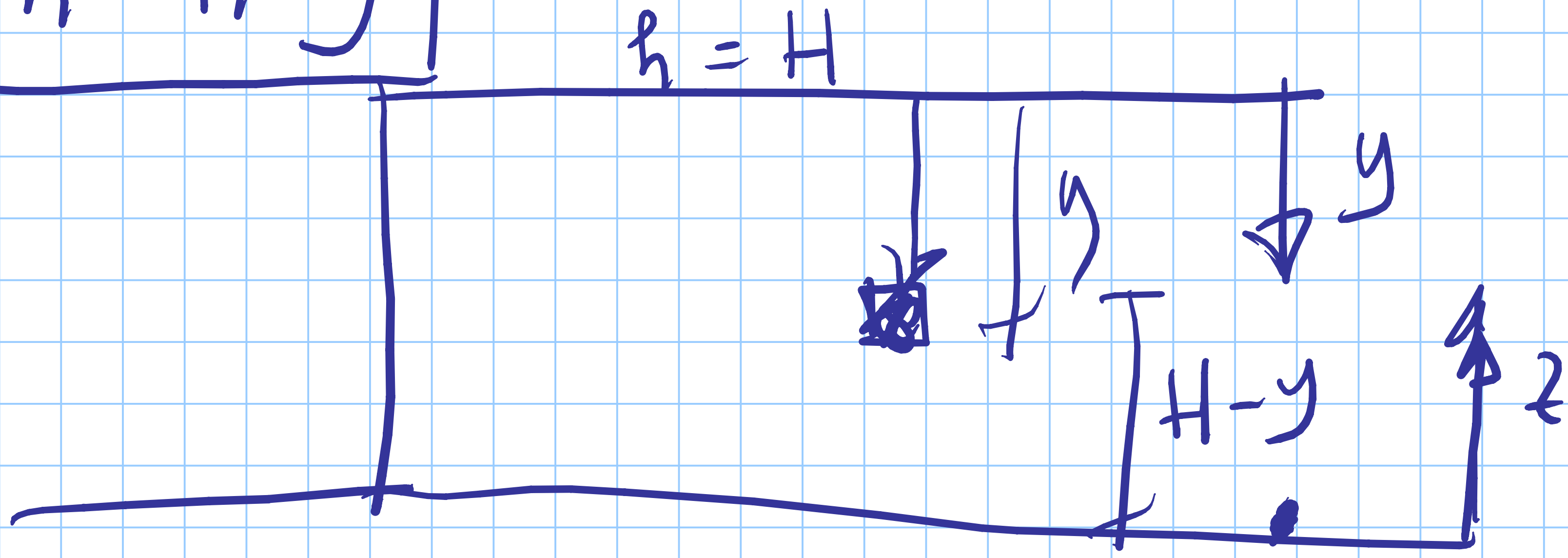


$$\frac{dh}{dy} = c_1 \qquad h = H - y$$

$$h = \underline{c_1} y + \underline{c_2}$$

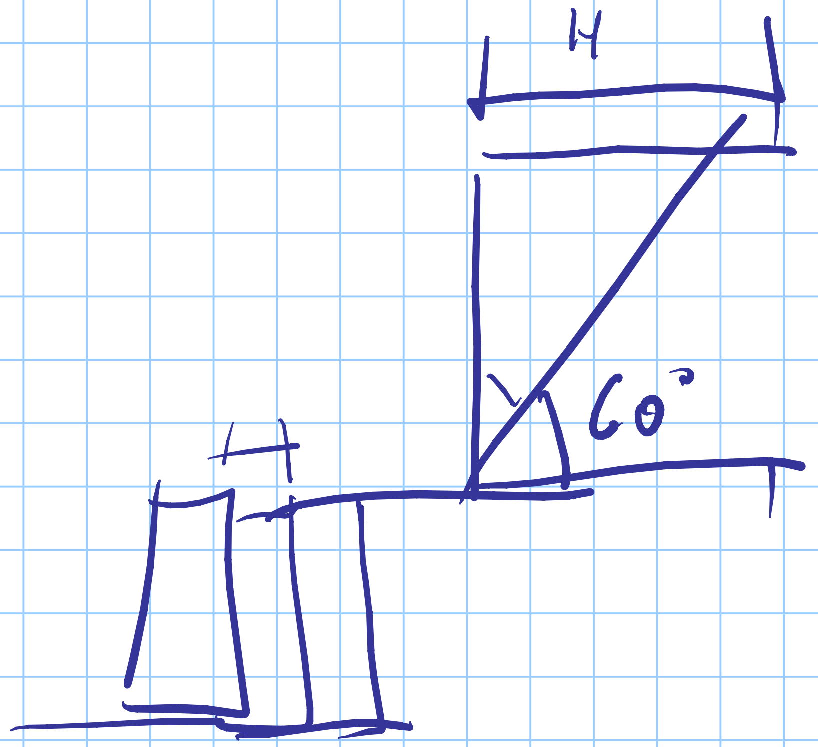
$$\boxed{h = H - y}$$

Se $y = 0$ $h = H$



$$\frac{u}{\gamma_w} = h - z =$$

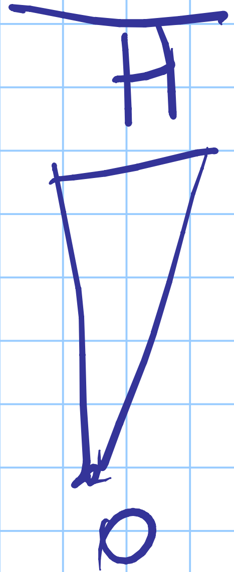
$$H - y - H + y = 0$$



$V = k\,0 = 1$

$$\gamma' \to \gamma_{sat}$$

$$\gamma' \to \gamma' + i\gamma_w$$

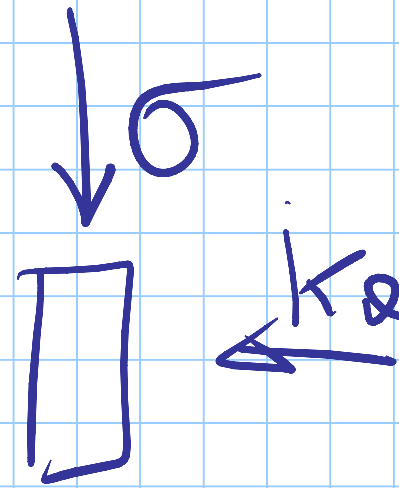


$$i = \frac{H - 0}{H} = 1$$

$$S_a = \frac{1}{2}\gamma' H^2 k_a + \frac{1}{2}\gamma_w H$$

$$= 0$$

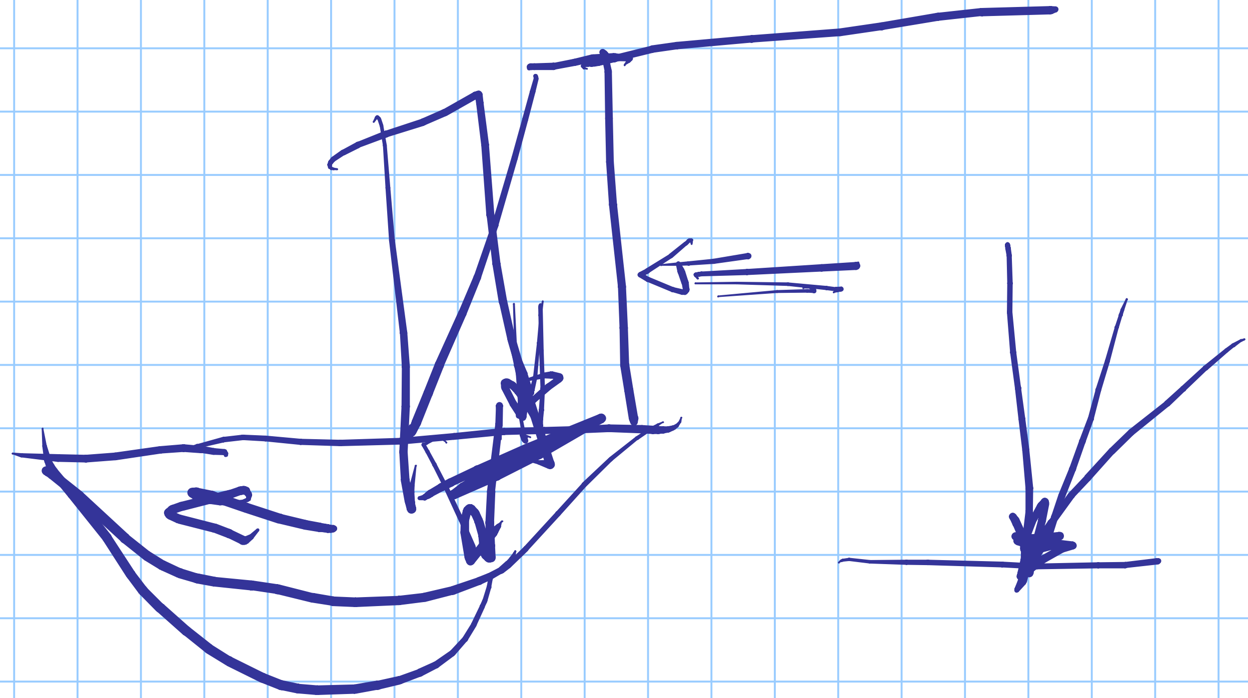
$$S_e = \frac{1}{2}\gamma_{sat} H^2 k_e$$

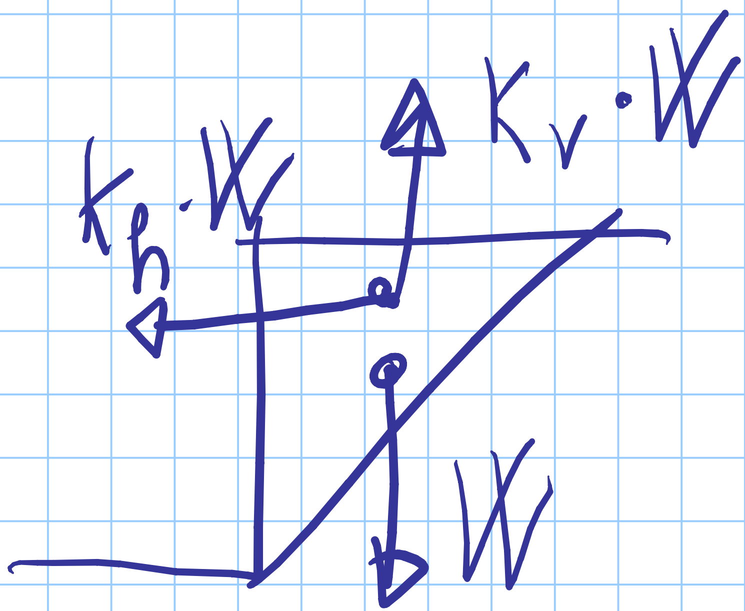


$$k_a \sigma_v = \sigma_H$$

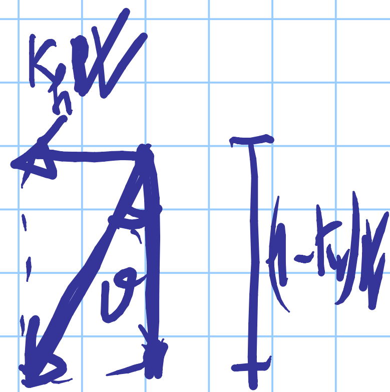
$$k_a = \sigma_v \cdot k$$

$$\sigma_H = \underline{k_a} \, \sigma_v$$



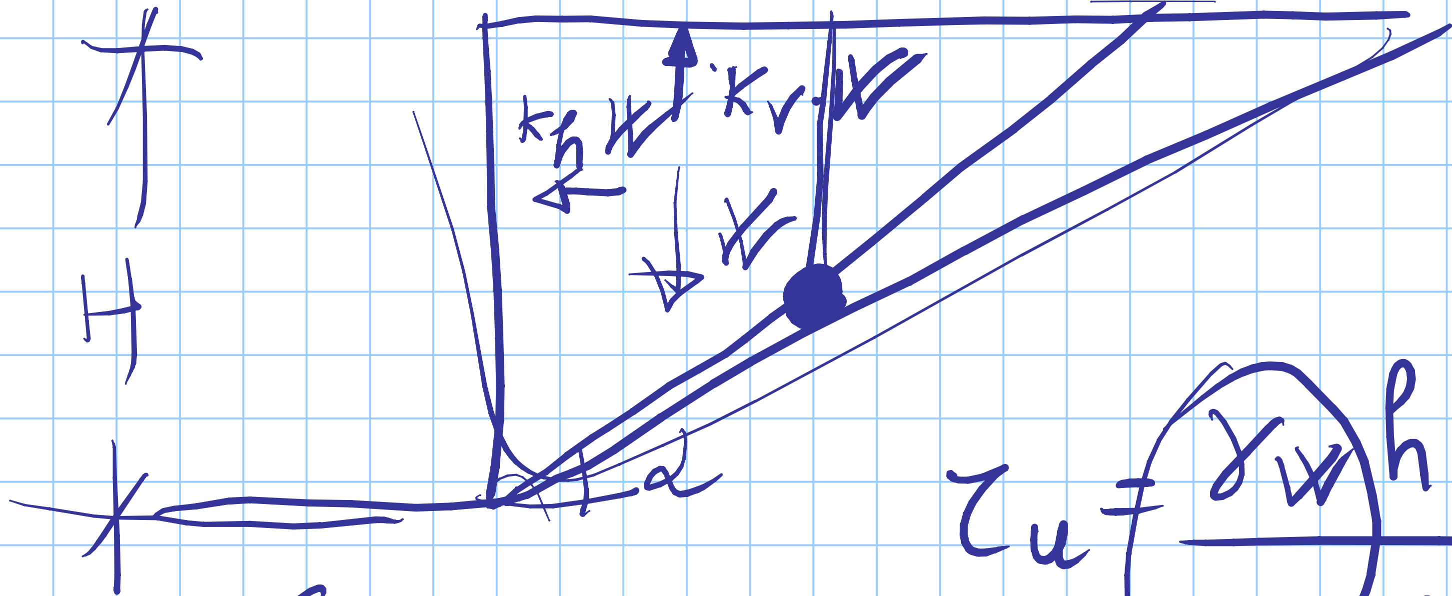


$K_h \cdot W$
$K_v \cdot W$
W



$K_h W$
ϑ
$(1-K_v)W$

$$F_v = a_v \cdot \frac{m g}{g} = k_v \cdot W$$



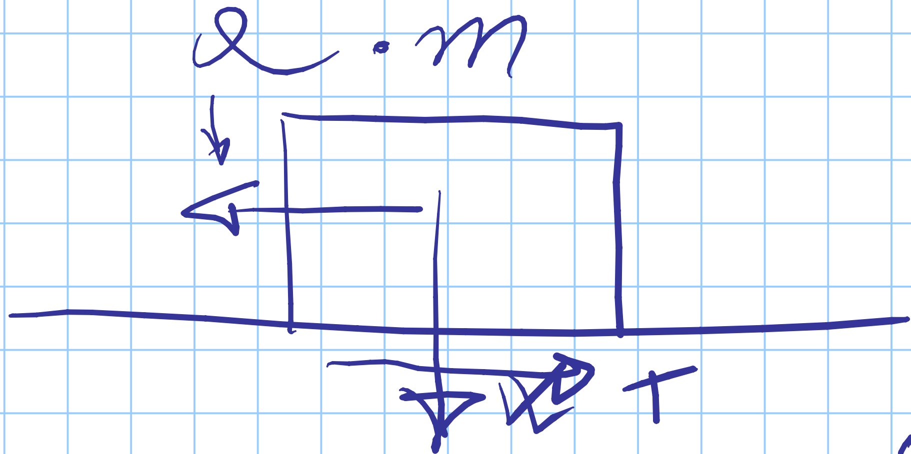
S_o

0.5

$$\tau_u = \frac{\gamma_w h_w}{\gamma \cdot h} =$$

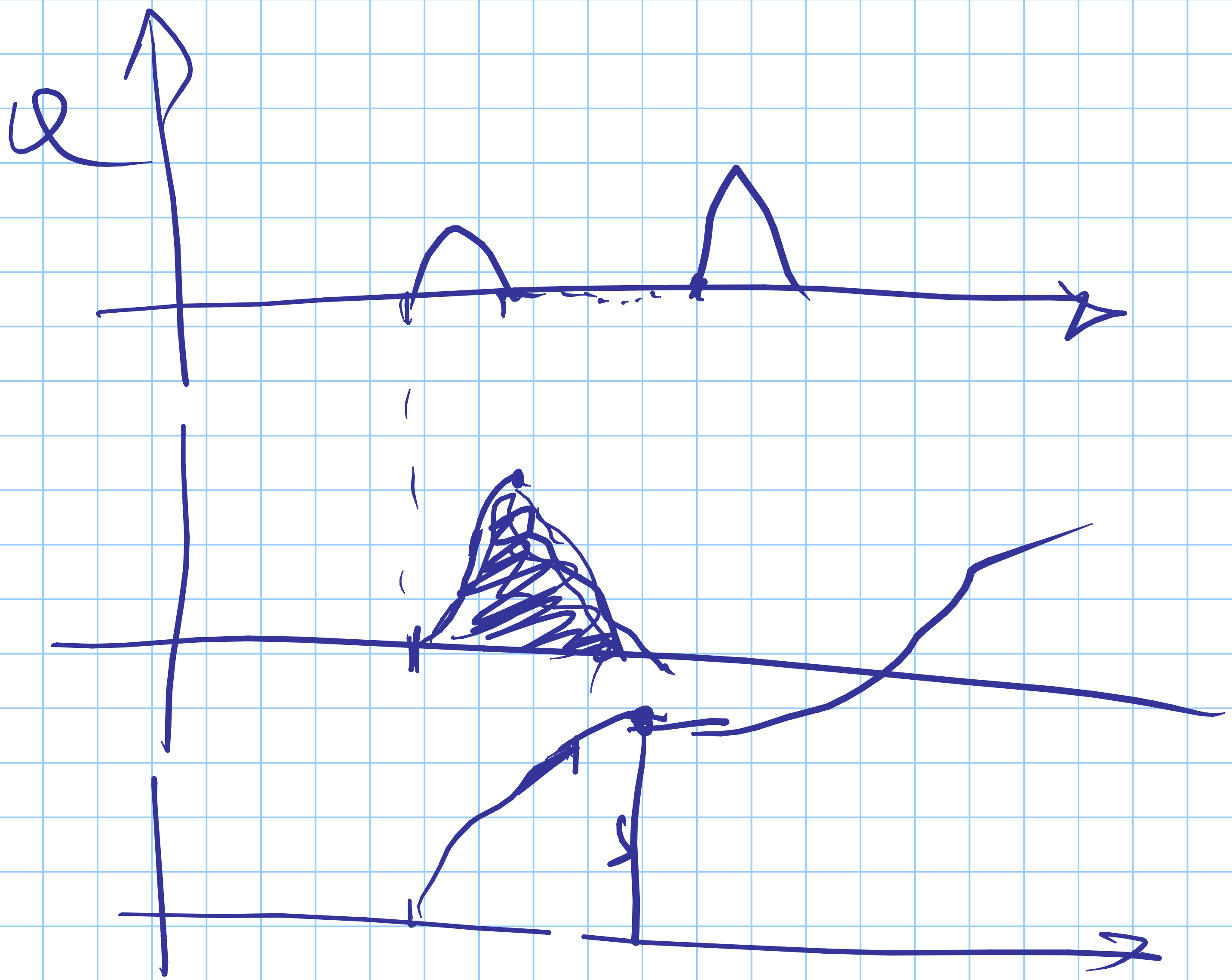
$-$

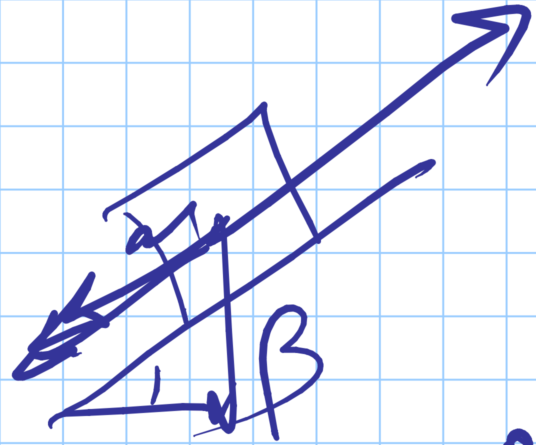
$$T = W \cdot \operatorname{tg}\varphi = mg\operatorname{tg}\varphi$$



$$a\cancel{m} = \cancel{m}g\operatorname{tg}\varphi$$

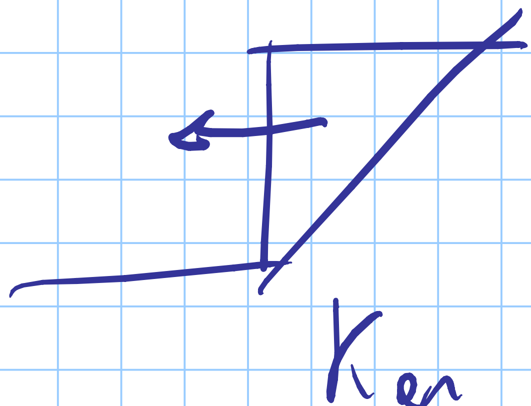
$$a_c = g\operatorname{tg}\varphi$$





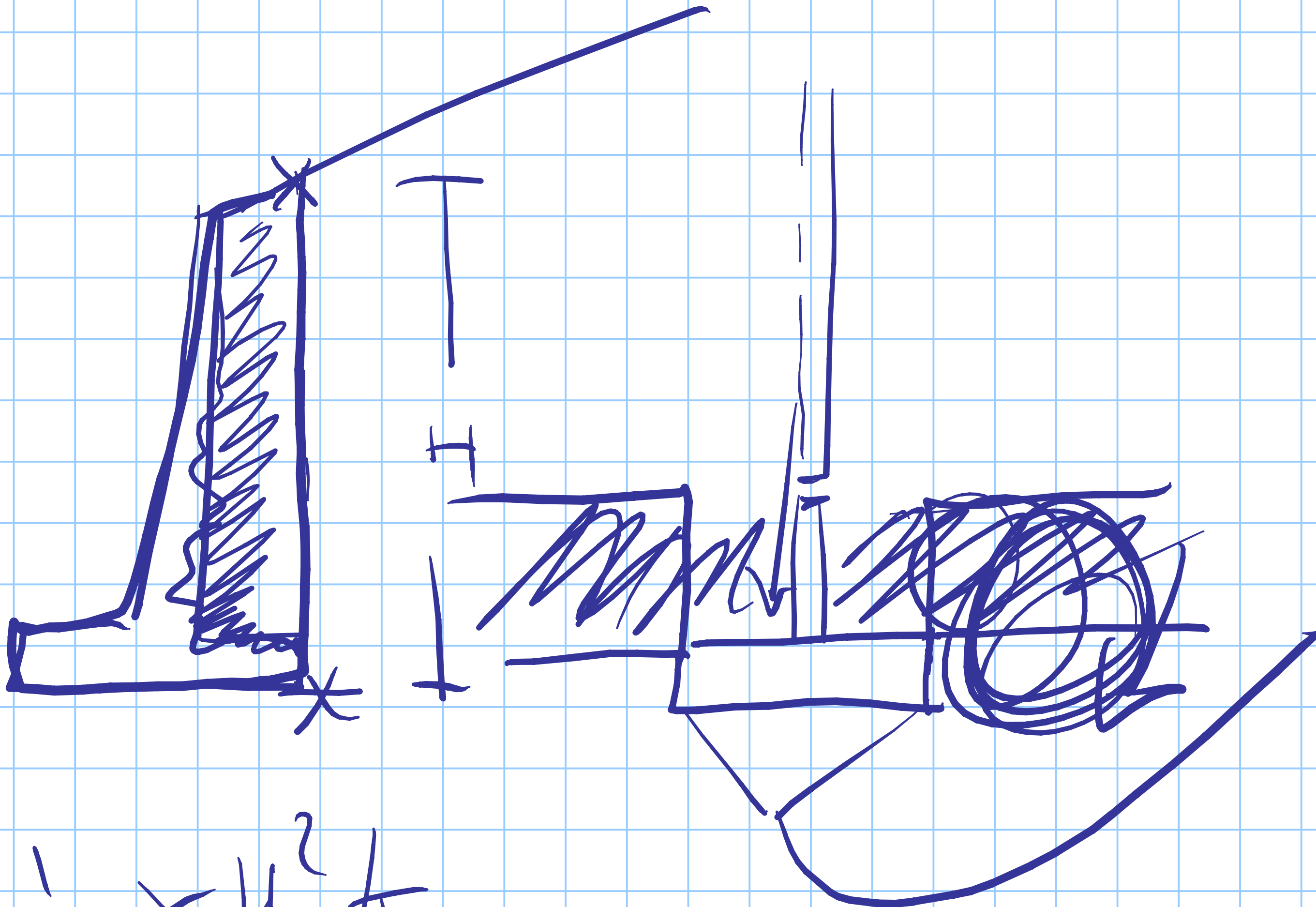
$\beta = 20^\circ$ $\varphi = 30^\circ$ =

$$g\left[\cos\beta \, tg\,\varphi - \operatorname{sen}\beta\right]$$

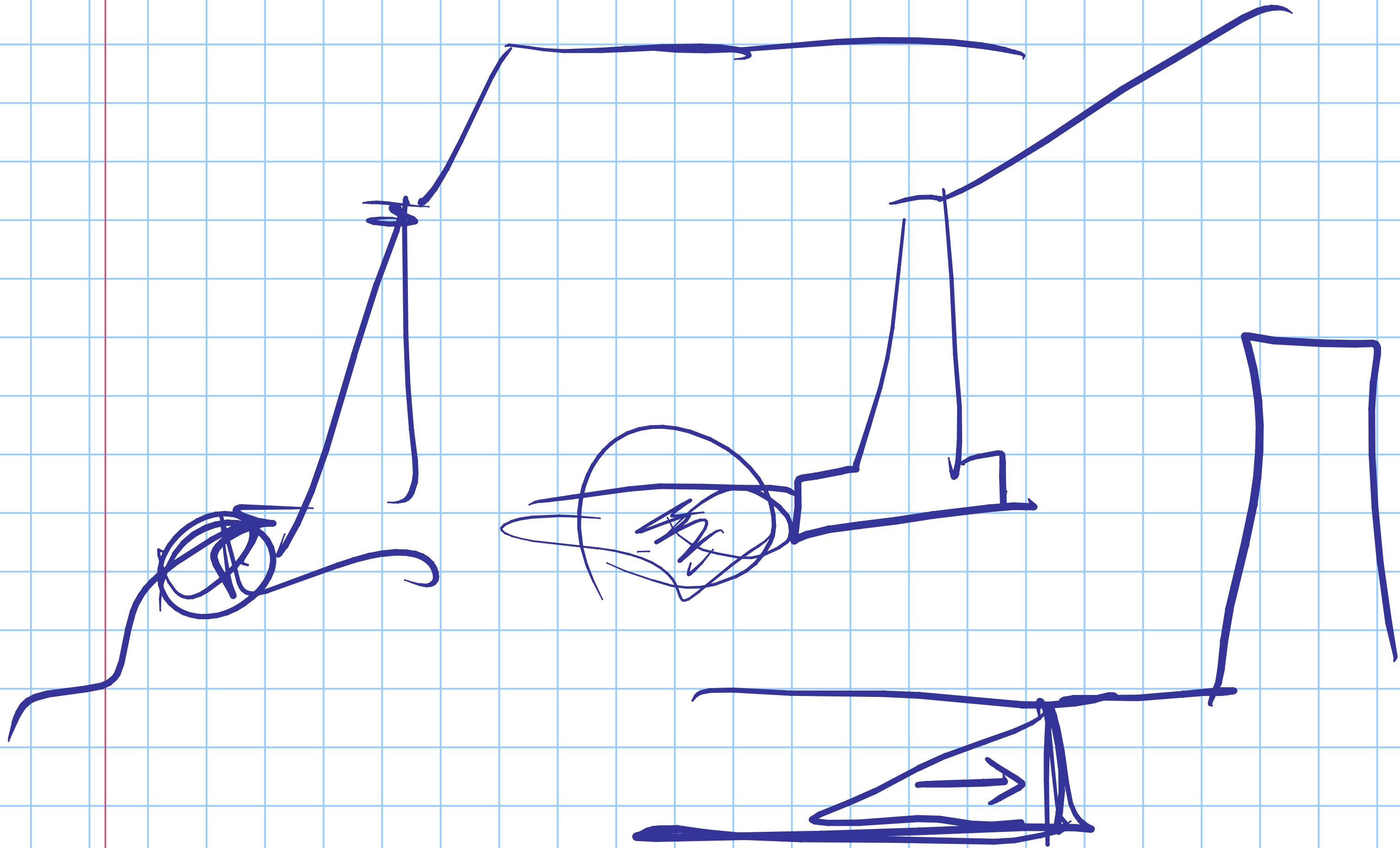


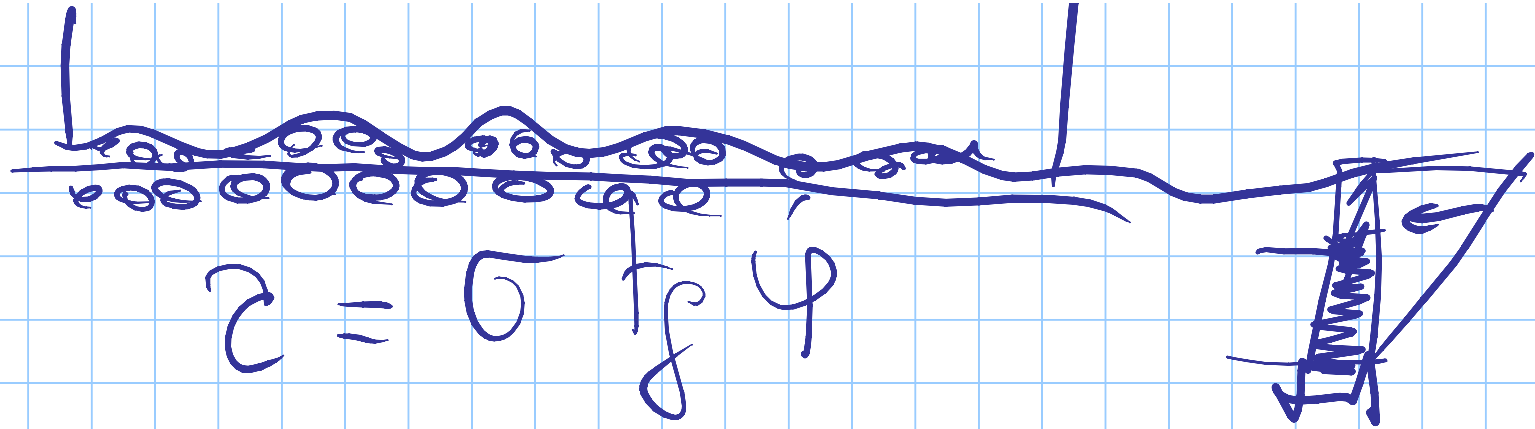
a_c = basso

$a_c \approx g$

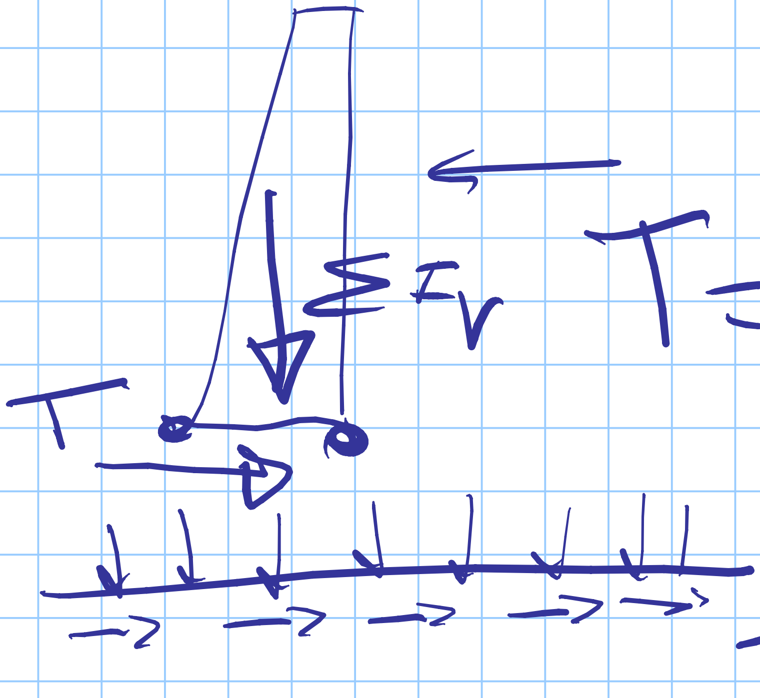


$$S_a = \frac{1}{2} \gamma H^2 K_a$$



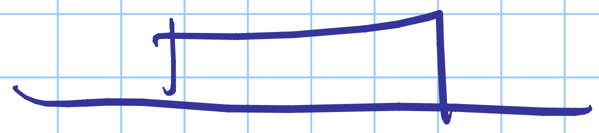


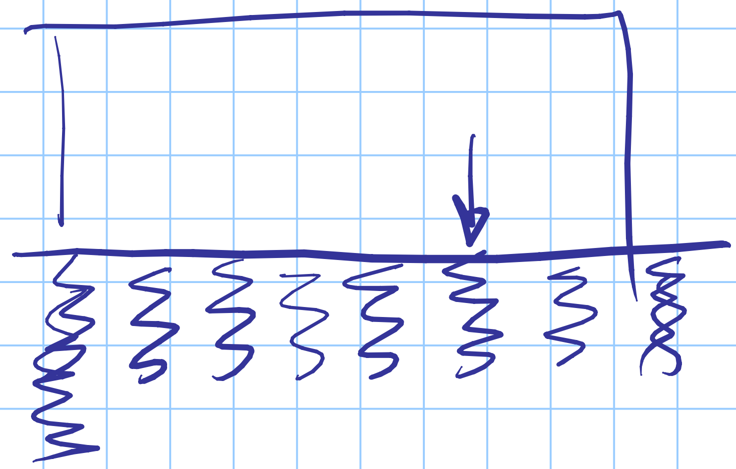
$$\tau = \sigma \operatorname{tg} \varphi$$



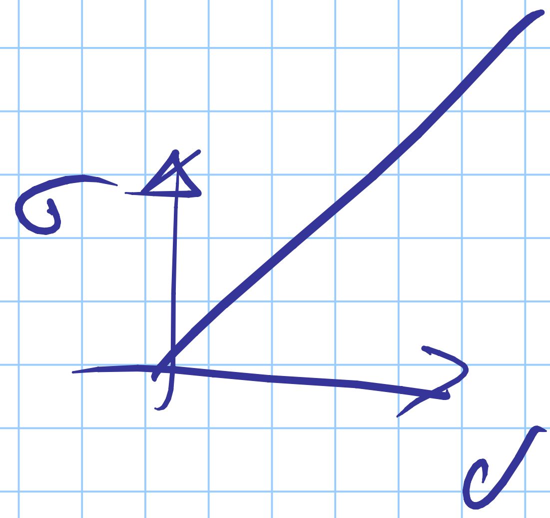
$$T = \int \sigma \operatorname{tg} \varphi$$

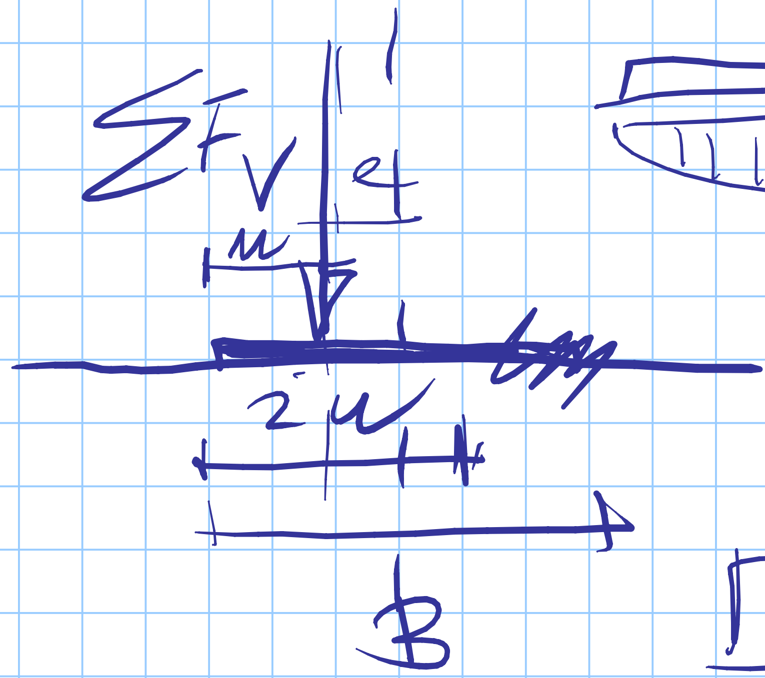
$$T = \Sigma F_v \operatorname{tg} \varphi$$

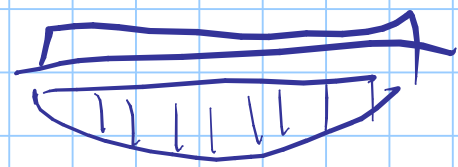


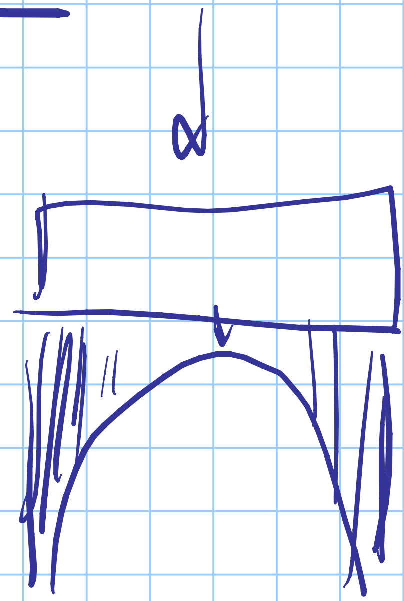


$$\delta = \frac{\sigma}{k}$$







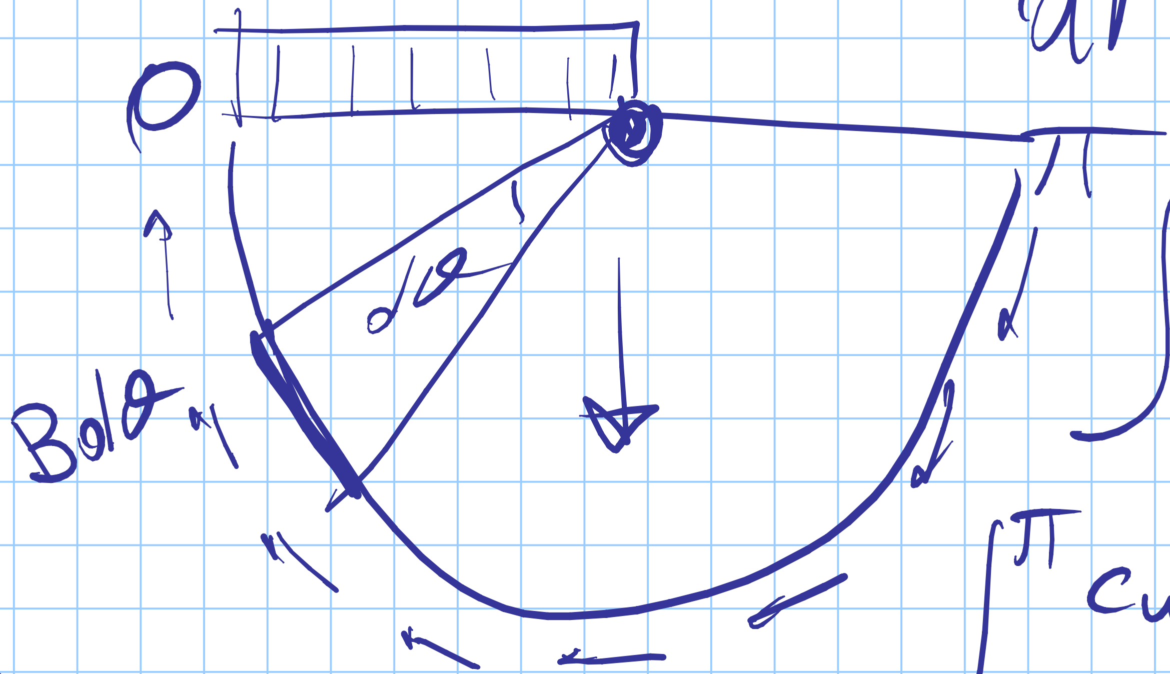


$$q_{en.} = \frac{\Sigma F_v}{B' \cdot 1}$$

$$q_{lim}\,\frac{\cancel{B^2}}{2} = c_u \cancel{B^2}\,\pi$$

$$dF = B\,d\theta \cdot c_u$$

$$dM = c_u B^2 d\alpha$$



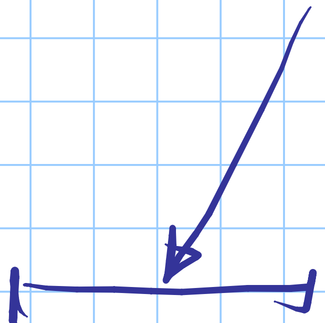
$$\int_0^\pi dM$$

$$\int_0^\pi c_u B^2 d\alpha$$

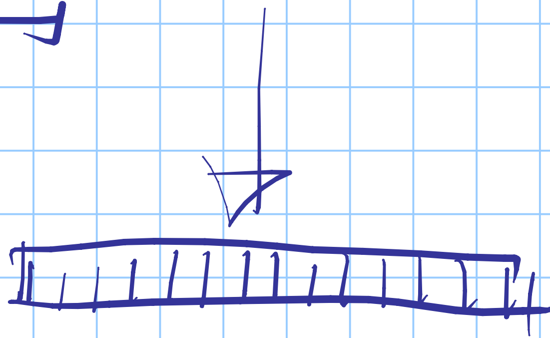
$$q_{lim} = 2\pi c_u$$

$$q_{Lim} = \frac{1}{2} B \gamma N_\gamma + c N_c + q N_q$$

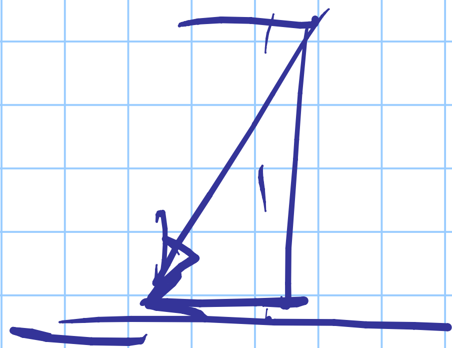
$\longrightarrow B \longrightarrow B'$

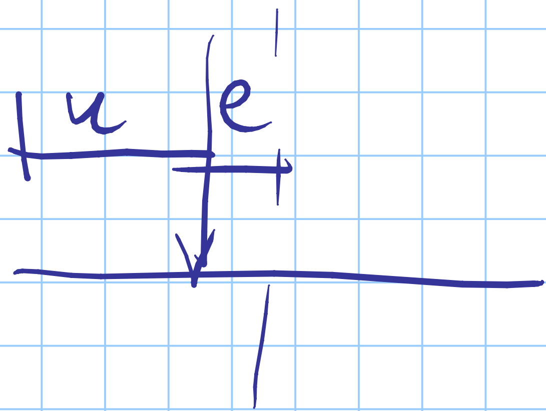


B'



$q_{L,u}$





$$B' = B - 2e'$$

$$q_{lim} = \frac{1}{2} B' \gamma N_\gamma i_\gamma s_\gamma \cdot d_\gamma \cdot b_\gamma g_\gamma$$

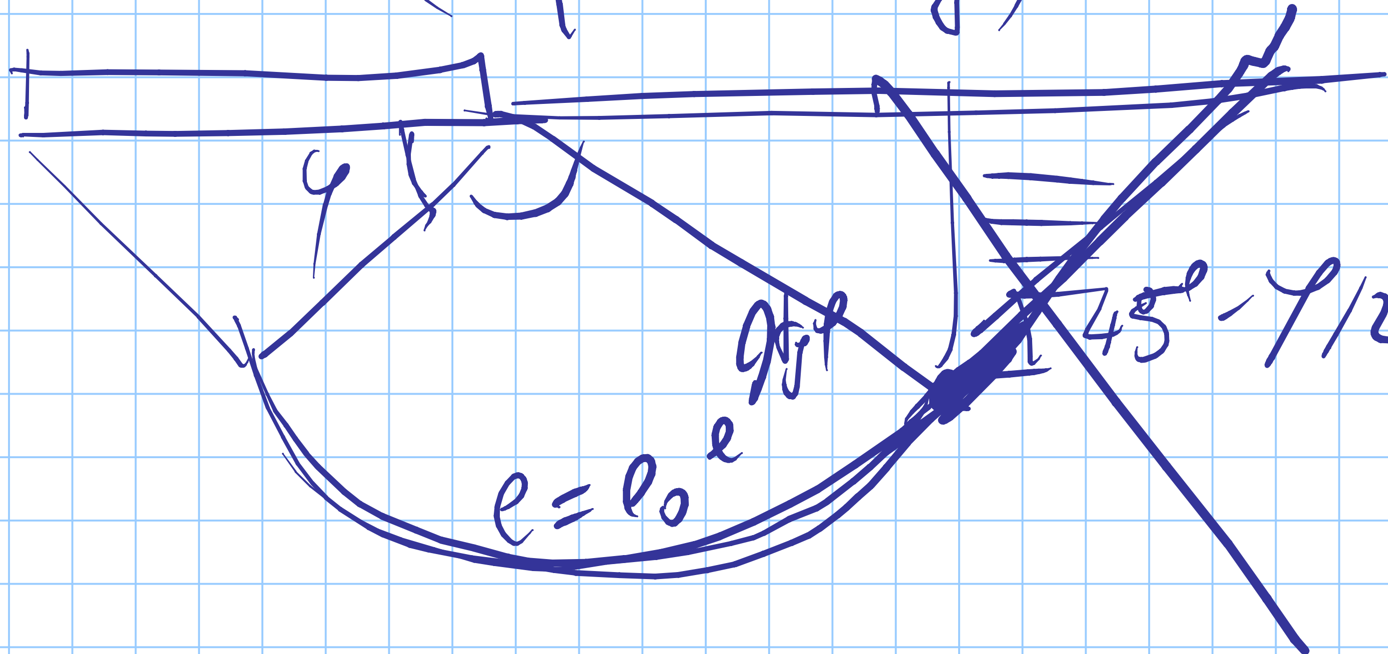
$$+ \; c N_c \, i_c s_c d_c b_c g_c$$

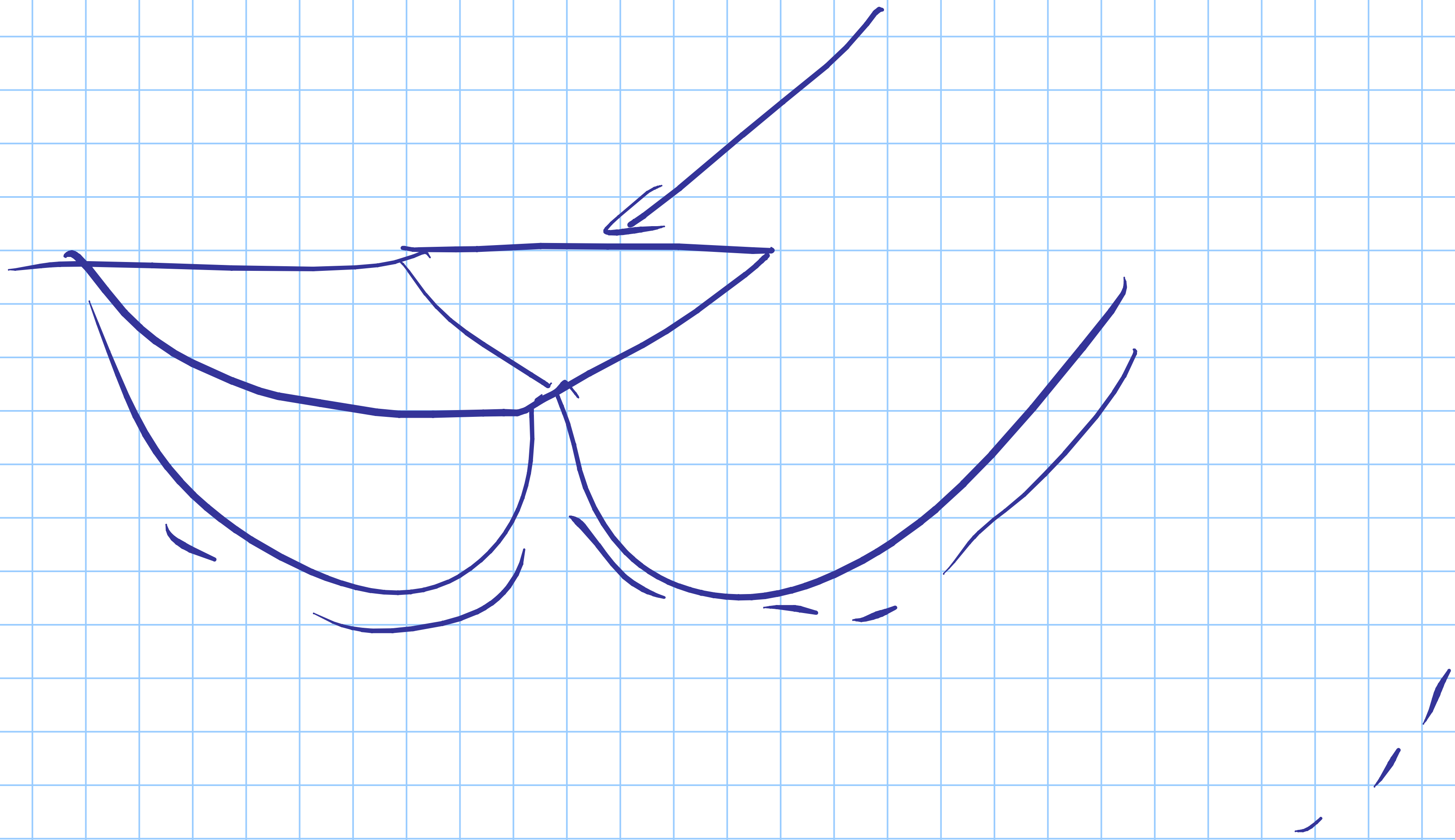
$$+ \; q N_q i_q s_q d_q b_q g_q$$

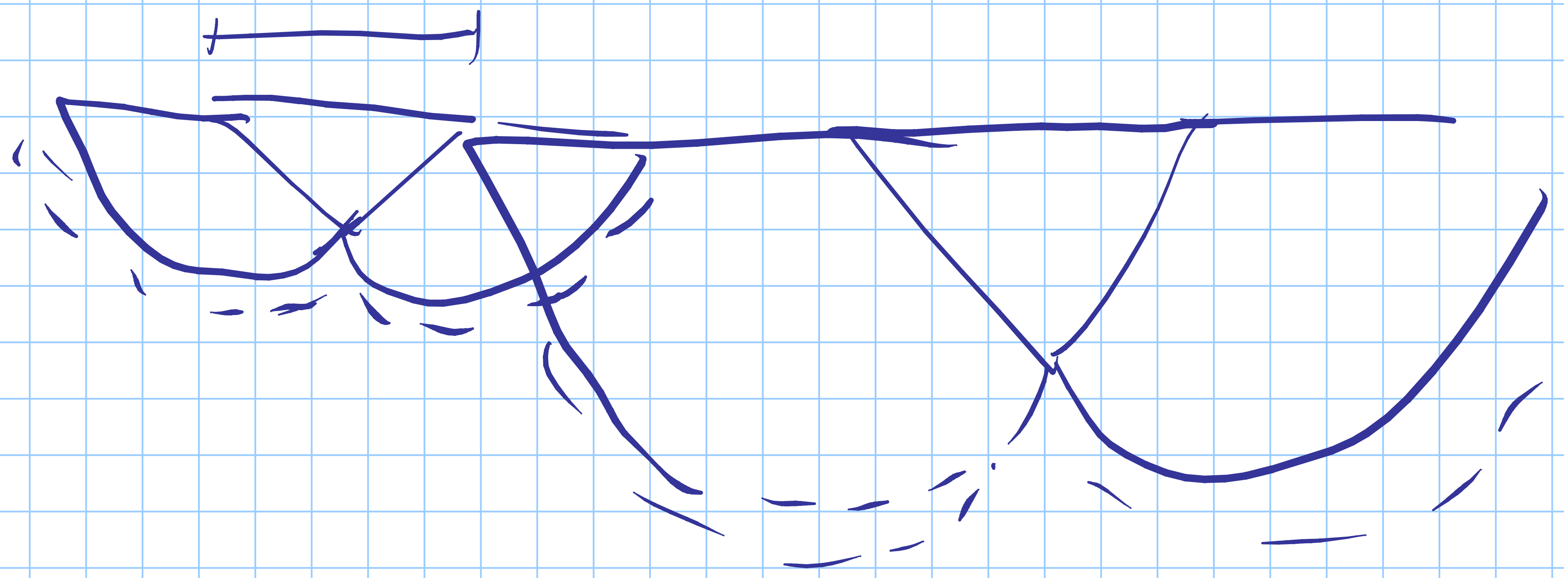
$$N_q = e^{\pi \operatorname{tg}\varphi} \cdot \operatorname{tg}^2(45 + \varphi/2)$$

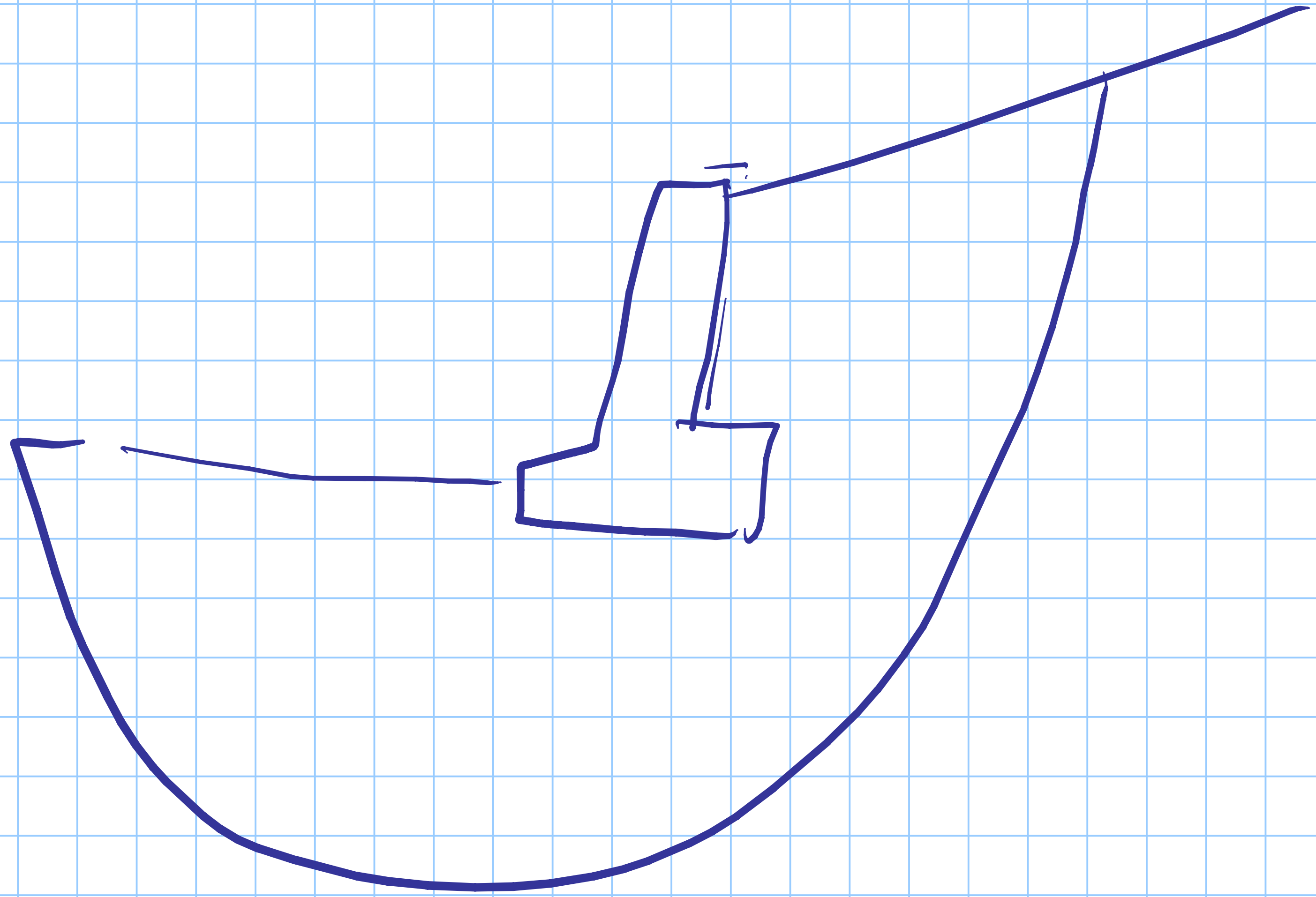
$$N_\gamma = 2(N_q + 1)\operatorname{tg}\varphi$$

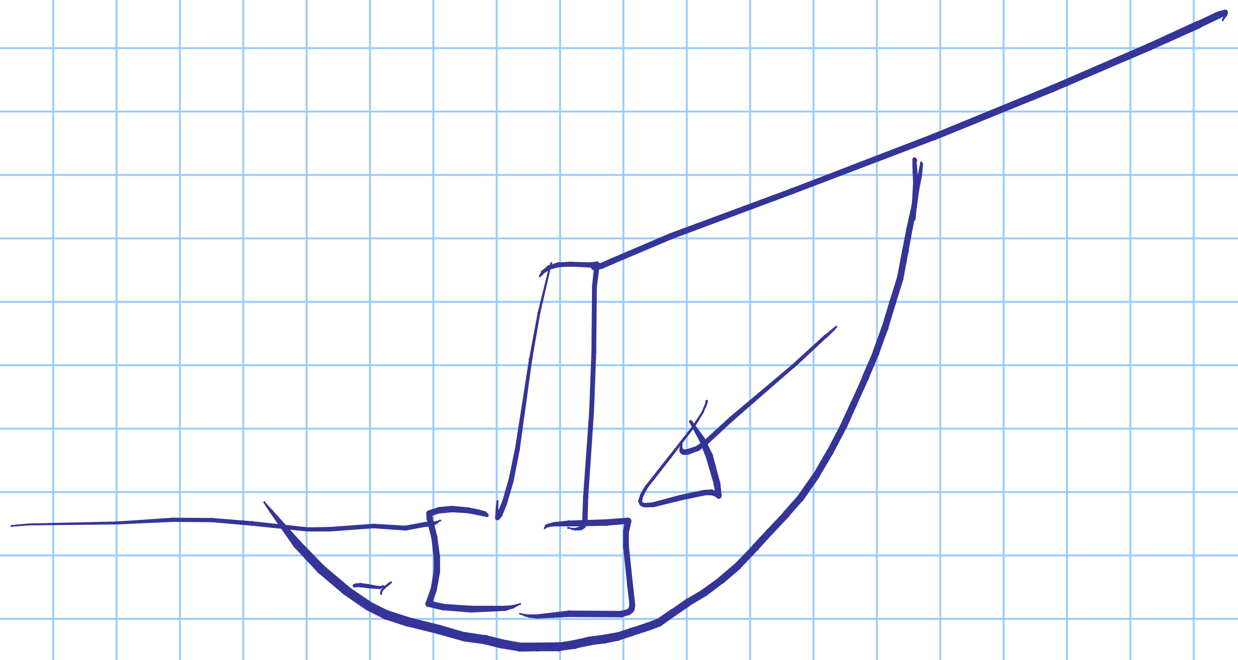
$$N_c = (N_q - 1)\cdot \operatorname{ctg}\varphi$$

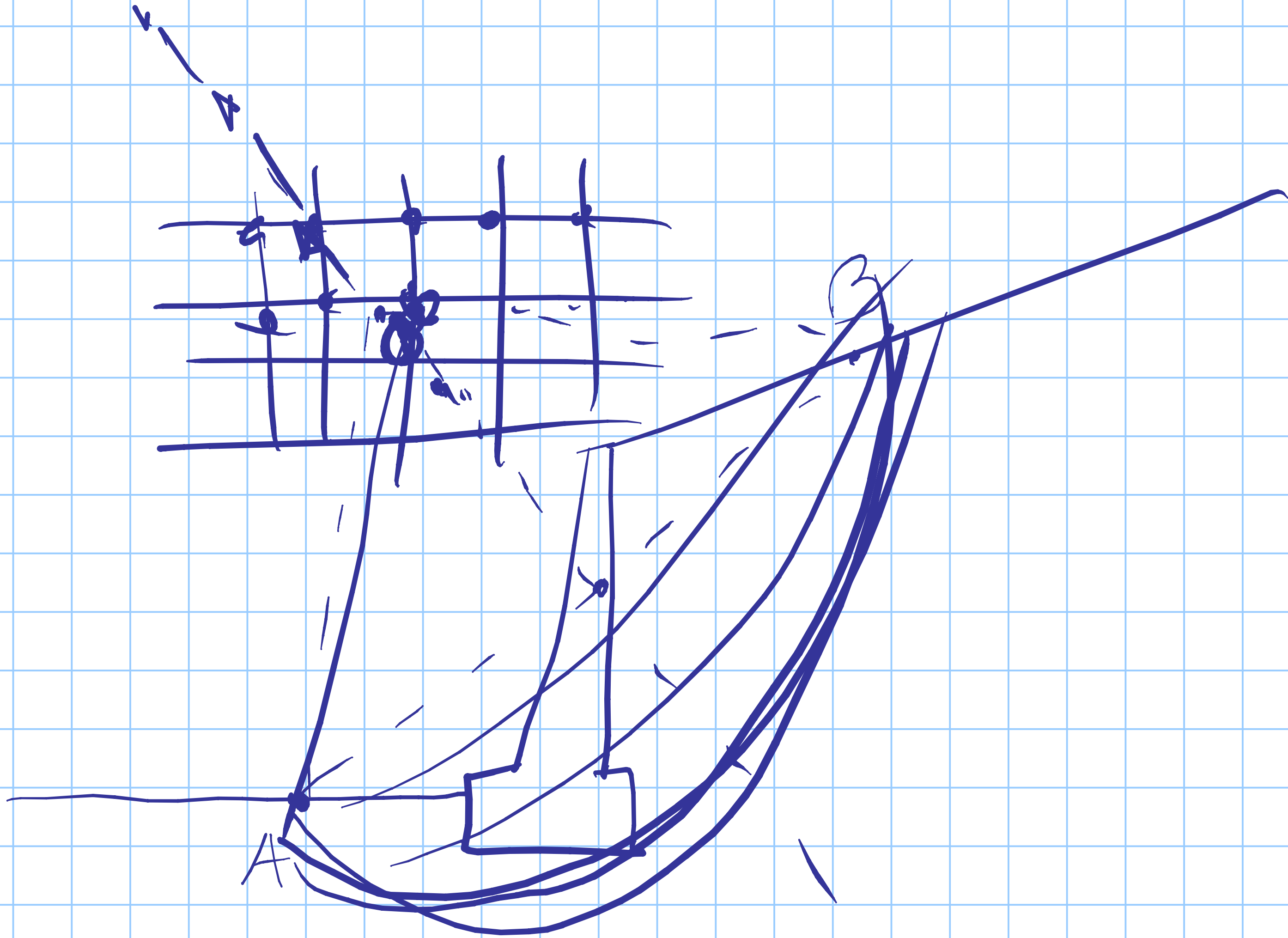




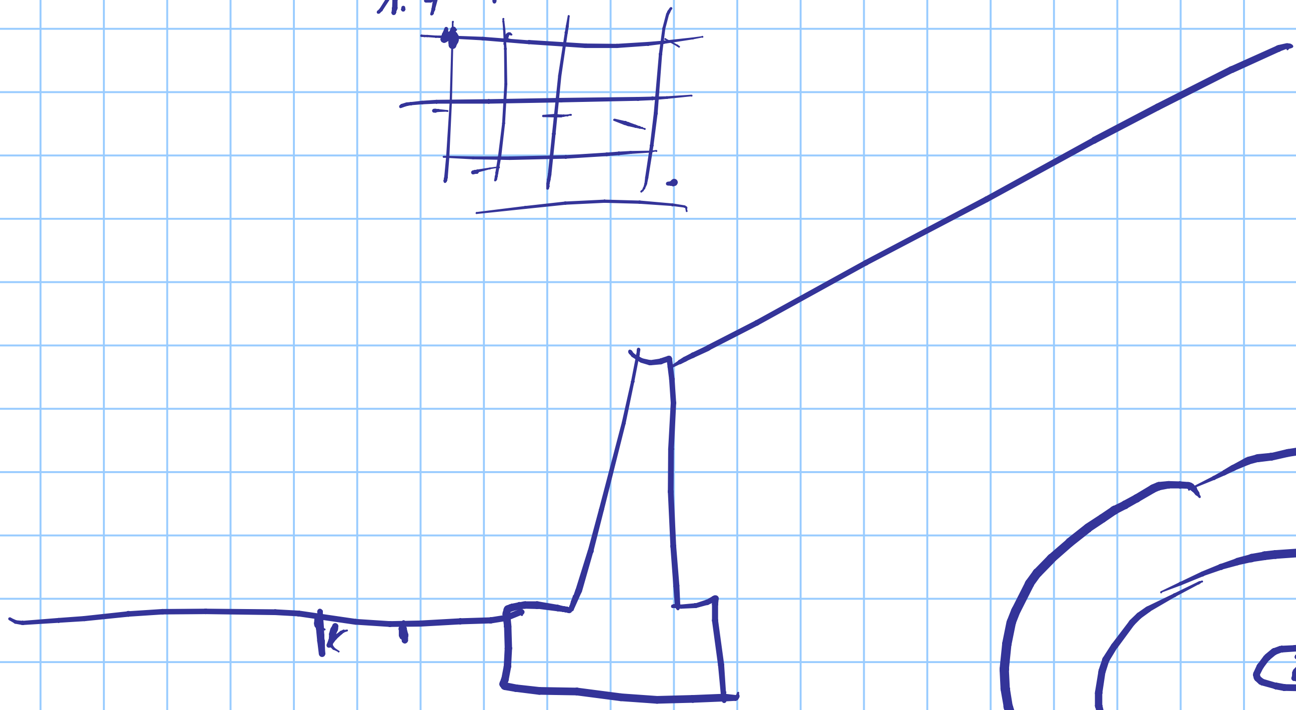


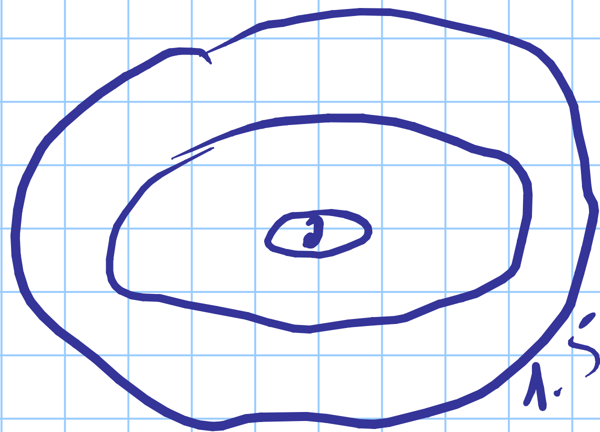




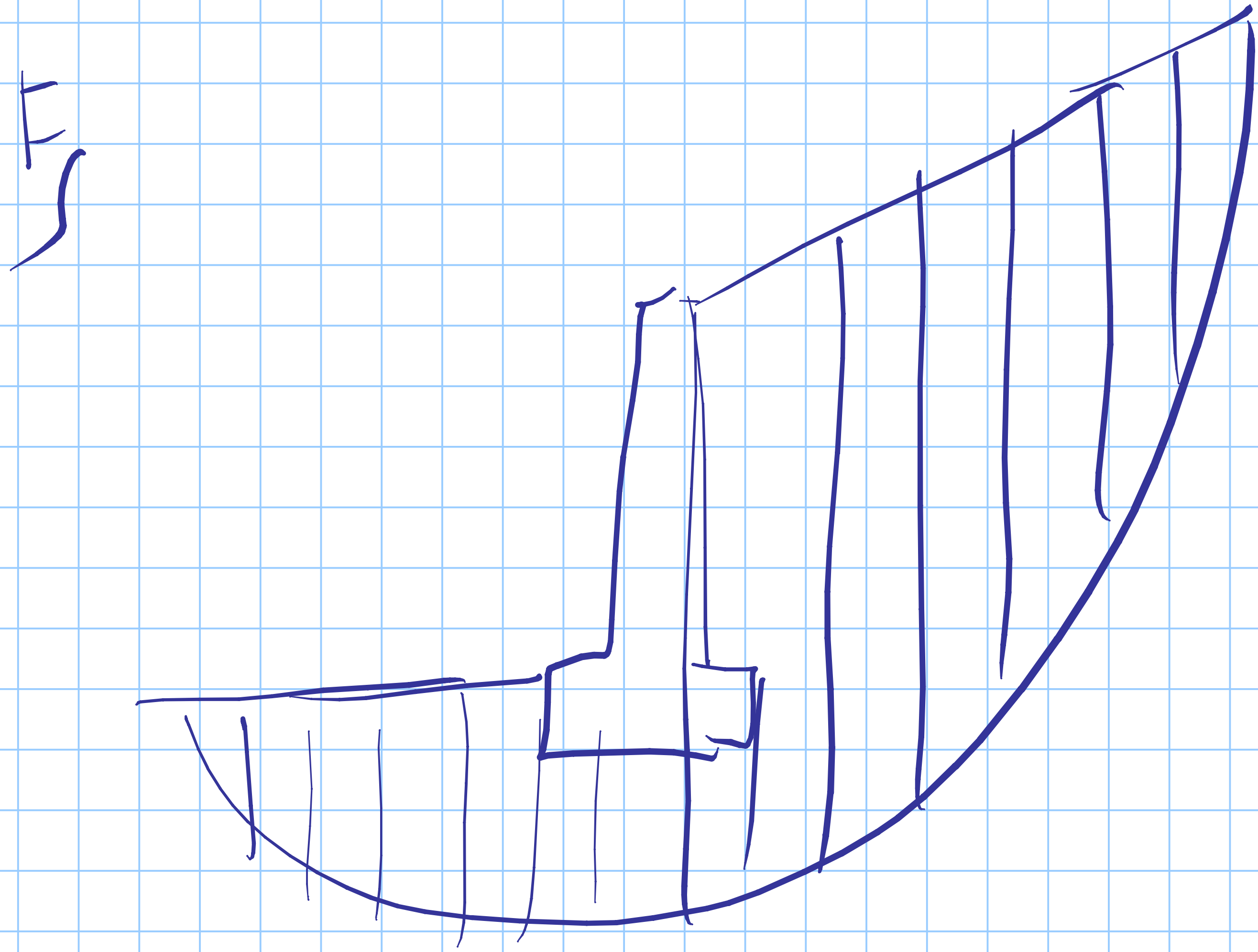

A

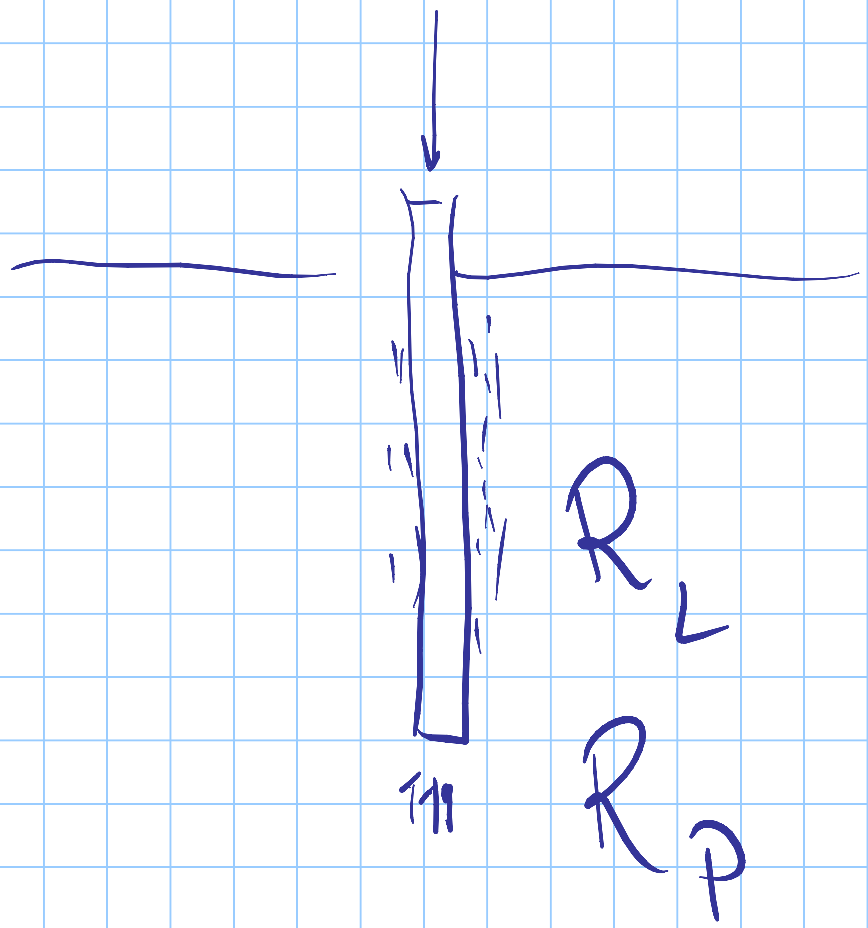
1.4

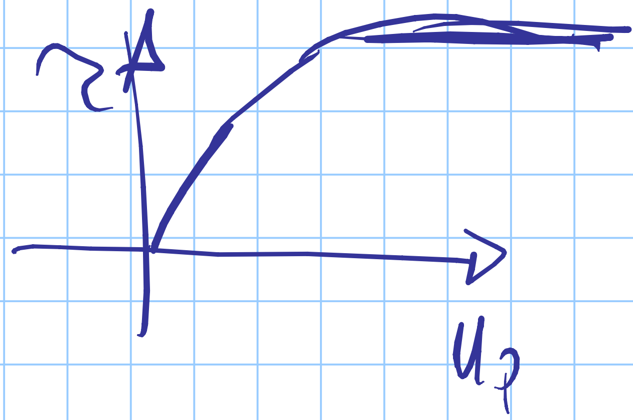




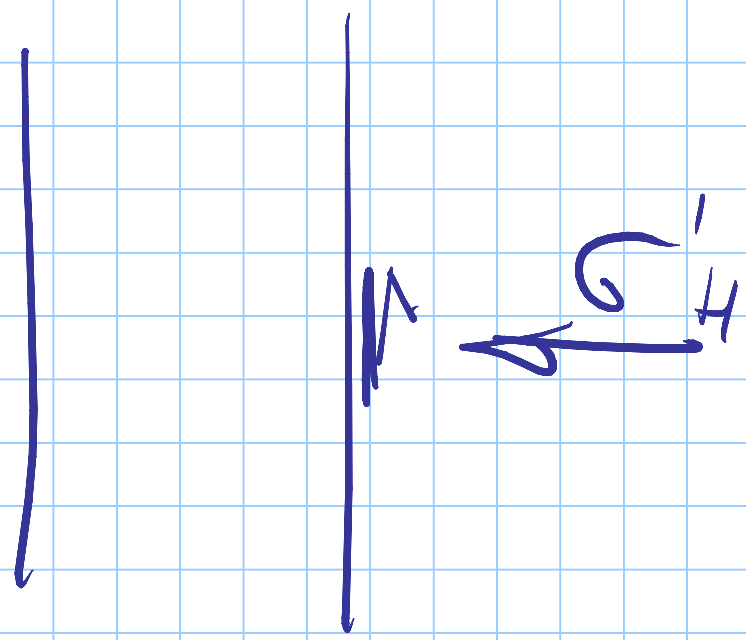
1.5

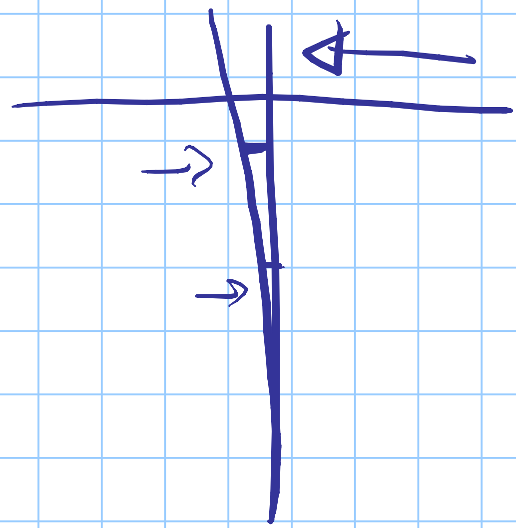


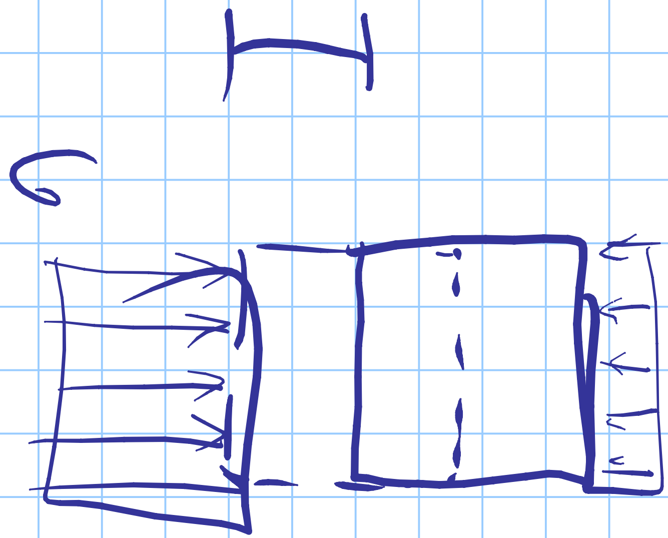

R L
R p

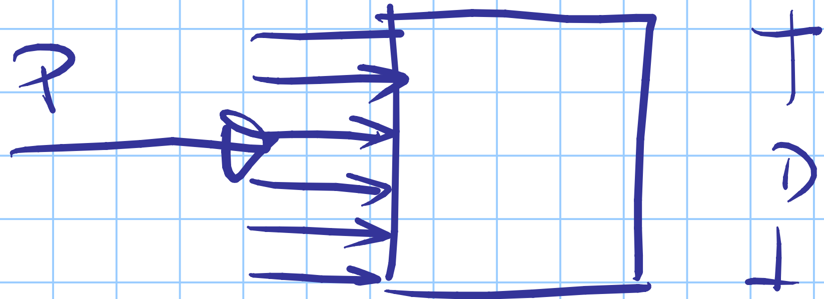

τ
u z

$$P_{lim} = R_p + R_L$$

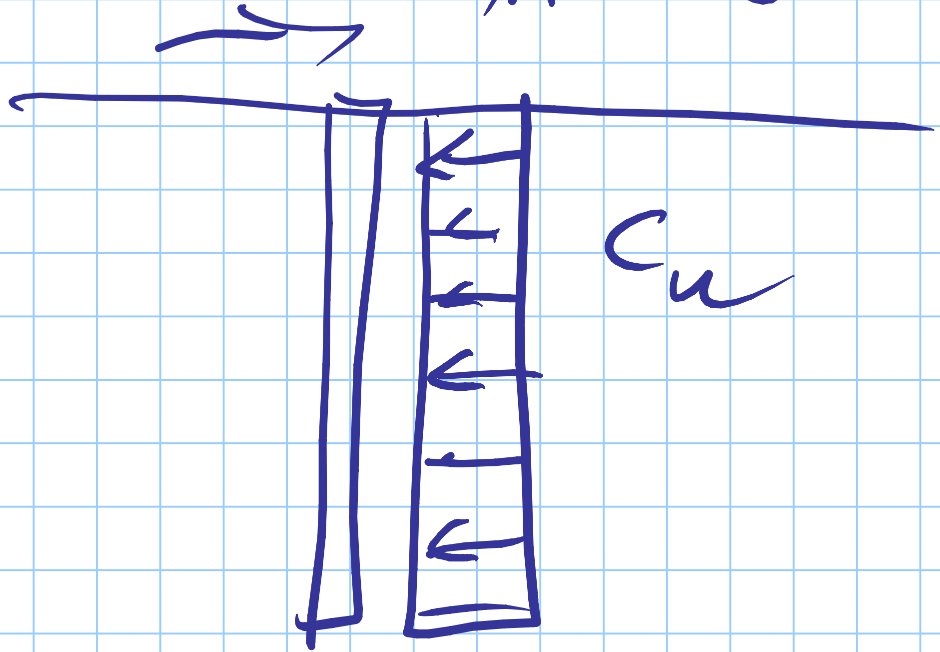




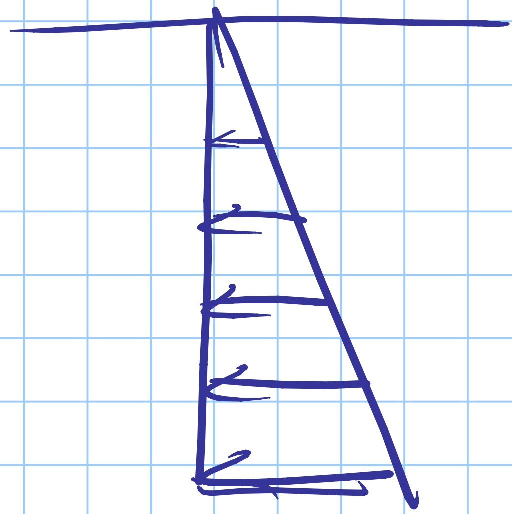


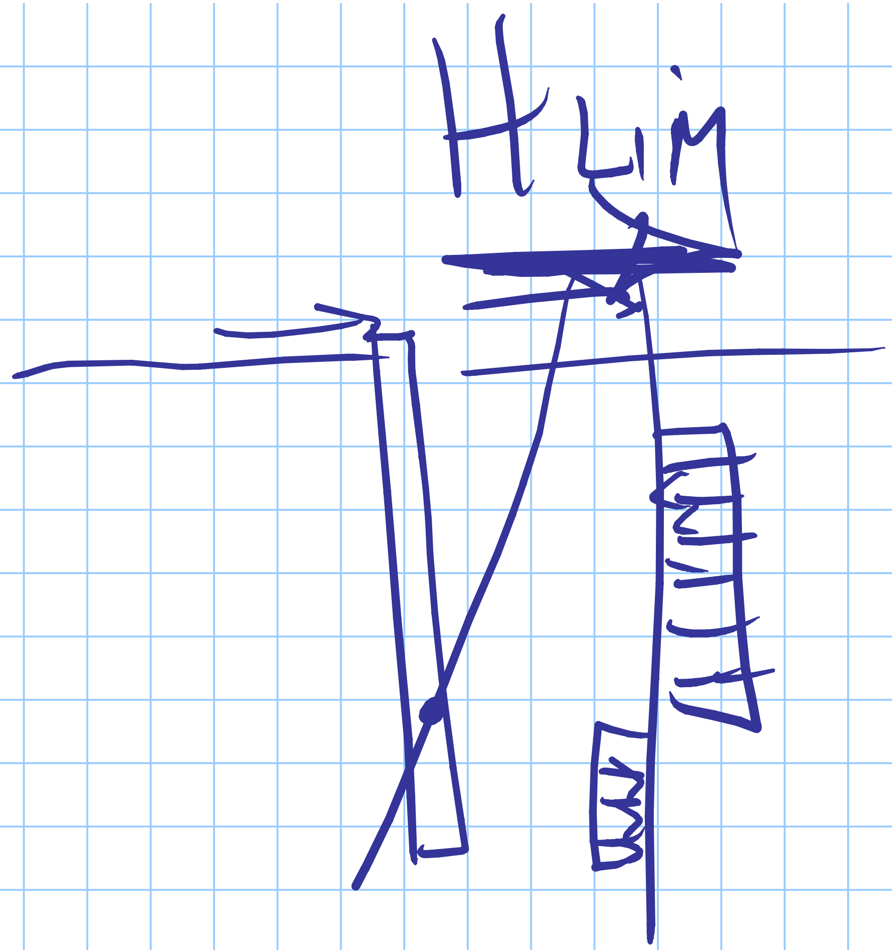

P
D

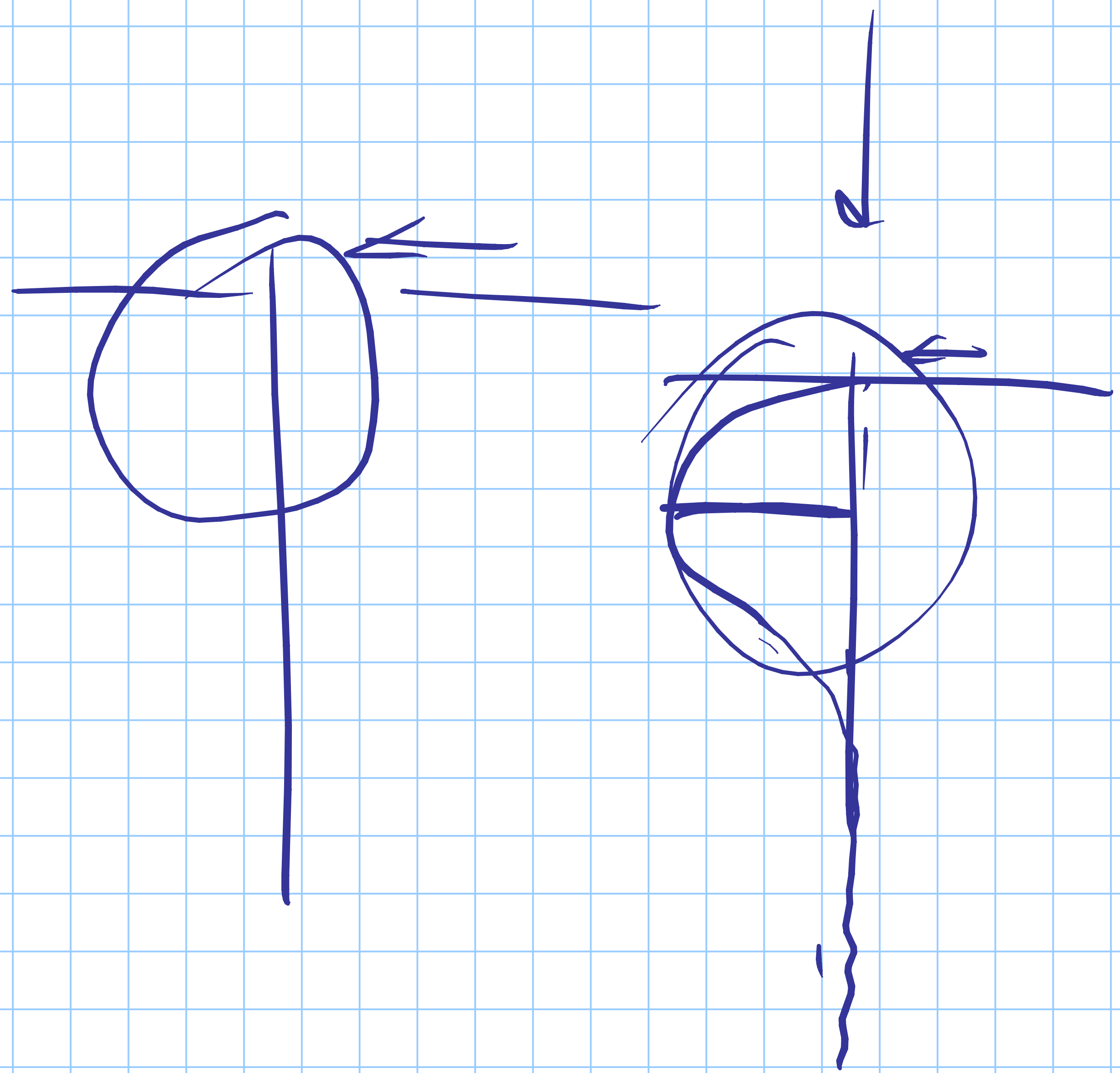
$$P_{Lim} = 9\, c_u D$$

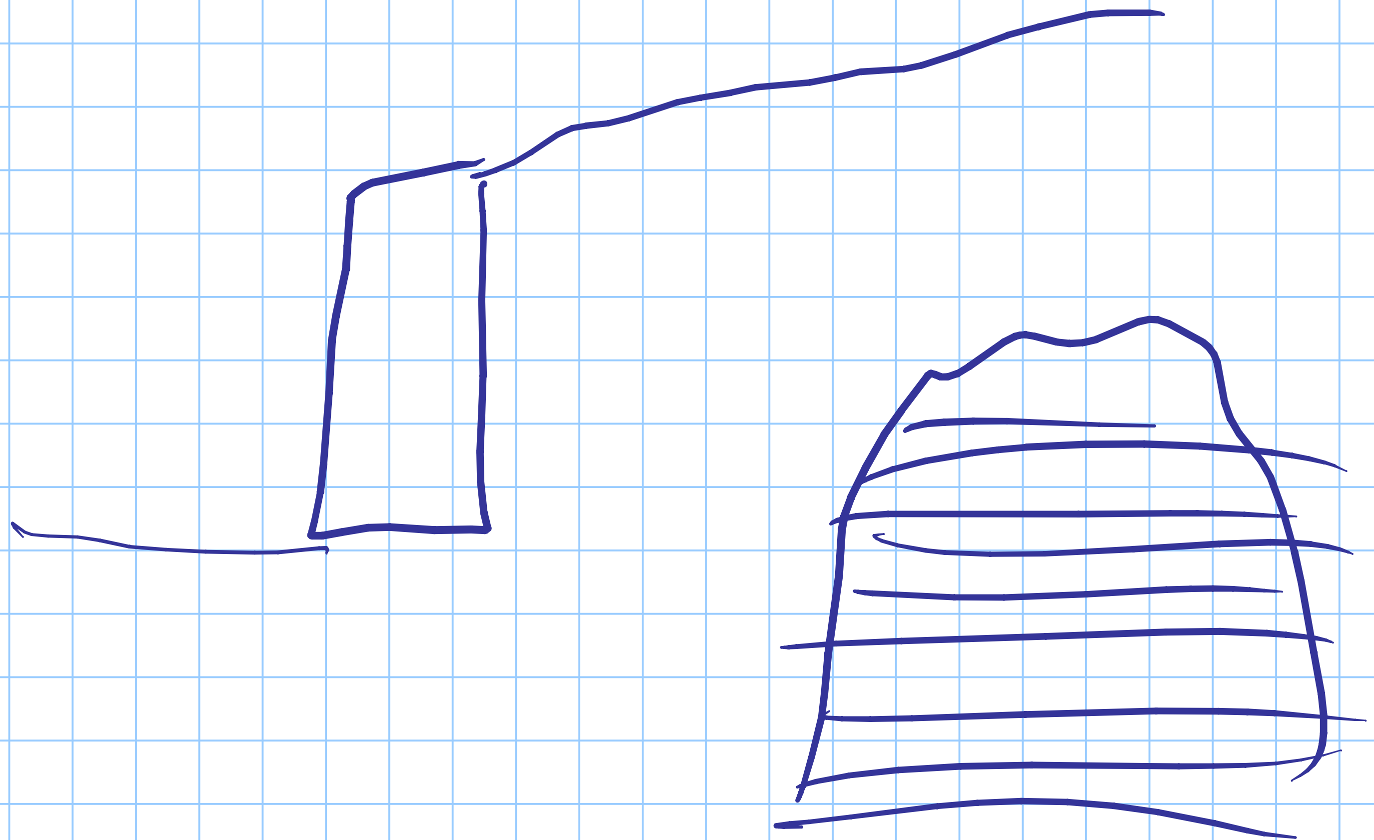


$$P_{Lim} = 3 \gamma K_p D Z$$

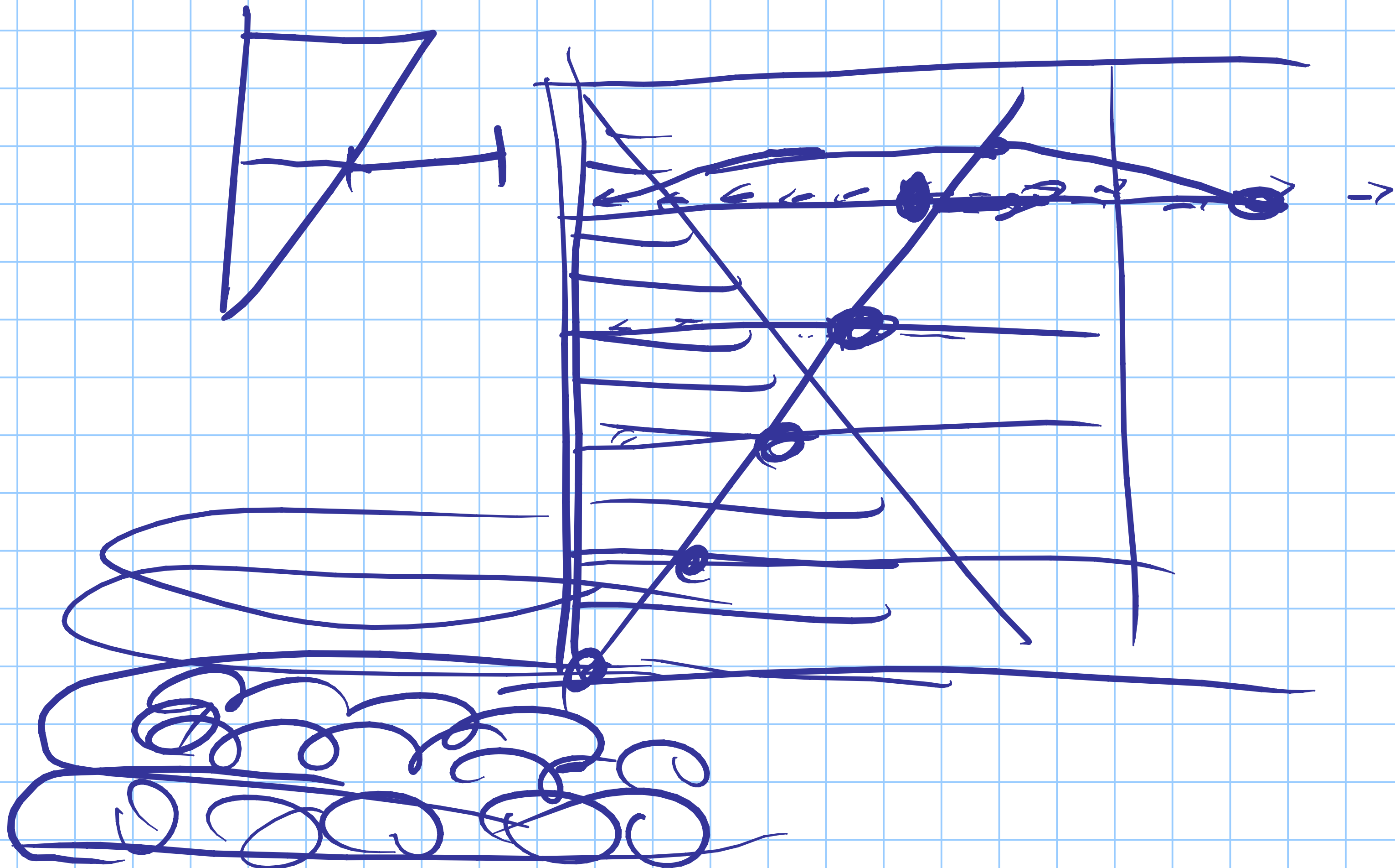


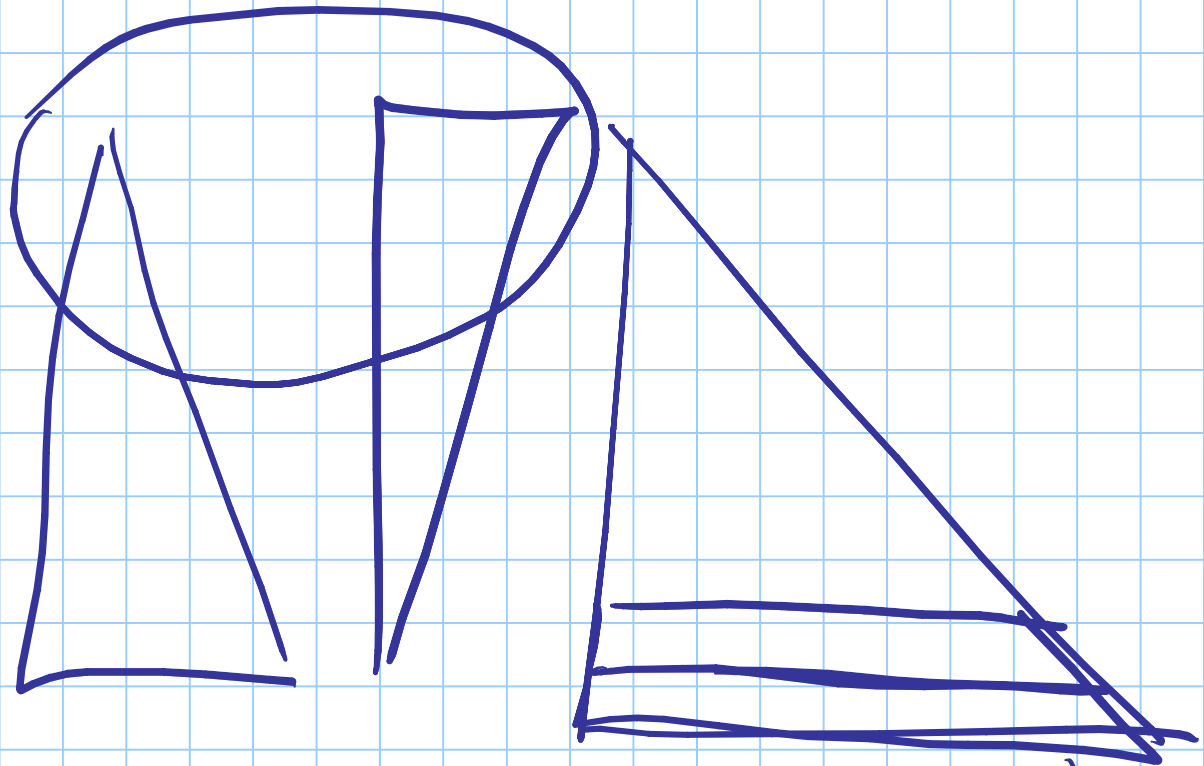






WRAP AROUND





$\gamma(HK\nu)K_{ee}+1$

$V = H \cdot \mathrm{tg}\,\delta$