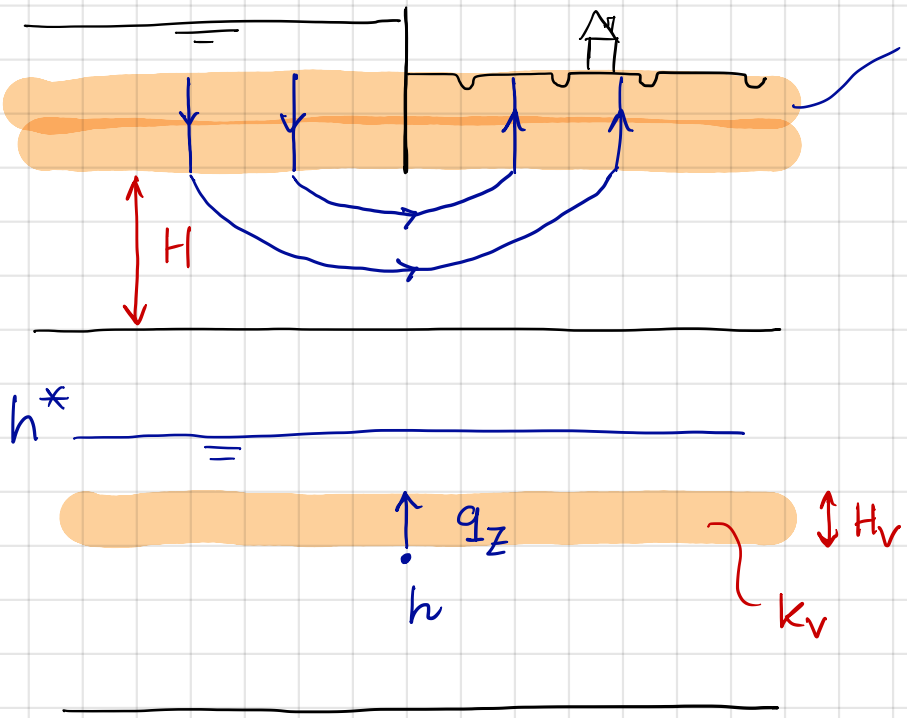
SEMI-CONFINED FLOW



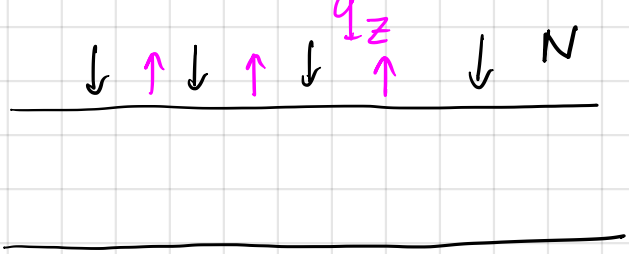
low permeability clay or peat leaky layer semi-confining layer

$$q_z = k_v \frac{h - h^*}{H_v}$$

$$\boxed{q_z = \frac{h - h^*}{c}}$$

resistance of leaky layer

$$c = \frac{H_v}{k_v} \qquad \frac{m\,d}{m}$$



$$\frac{d^2h}{dx^2} = -\frac{N}{kH} = \frac{+q_z}{kH}$$

$$\frac{d^2h}{dx^2} = \frac{h - h^*}{ckH} = \frac{h - h^*}{\lambda^2}$$

$$\lambda = \sqrt{kHc}$$

$$\sqrt{\frac{m}{d}\,m\,d} = m$$

λ → leakage factor "spreidings lengte"

$$\frac{d^2h}{dx^2} = \frac{h-h^*}{\lambda^2}$$

$$\boxed{\frac{d^2(h-h^*)}{dx^2} = \frac{h-h^*}{\lambda^2}}$$

h^* is constant

$$h - h^* = Ce^{ax}$$

$$\frac{d(h-h^*)}{dx} = Cae^{ax}$$

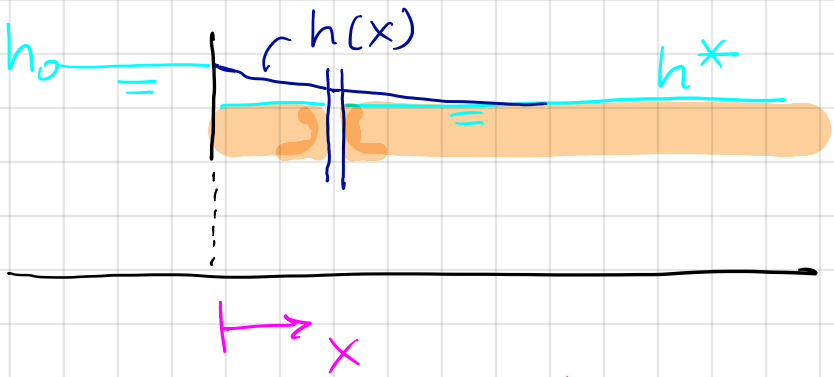
$$\frac{d^2(h-h^*)}{dx^2} = Ca^2e^{ax}$$

$$Ca^2e^{ax} = \frac{Ce^{ax}}{\lambda^2}$$

$$a = -\frac{1}{\lambda}$$

$$-\frac{1}{\lambda}$$

$$\boxed{h - h^* = A\,e^{-x/\lambda} + B\,e^{+x/\lambda}}$$



$x = 0 \longrightarrow h = h_0 \longrightarrow h - h^* = h_0 - h^*$

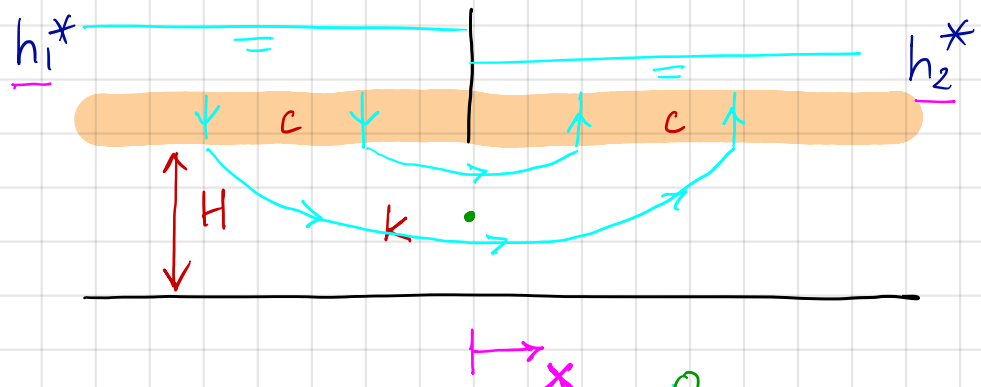
$x \to \infty \to h = h^* \longrightarrow h - h^* = 0$

$B = 0$

$$h(x=0) - h^* = A = h_0 - h^*$$

$$h - h^* = (h_0 - h^*)\,e^{-x/\lambda}$$

$$\boxed{h = h^* + (h_0 - h^*)\,e^{-x/\lambda}}$$



$x \le 0 \quad h = h_1^* + A_1 e^{-x/\lambda} + B_1 e^{x/\lambda}$ ($A_1 e^{-x/\lambda} \to 0$)

$x \ge 0 \quad h = h_2^* + A_2 e^{-x/\lambda} + B_2 e^{x/\lambda}$ ($B_2 e^{x/\lambda} \to 0$)

$Q_x = -\frac{kHB_1}{\lambda} e^{x/\lambda}$

$Q_x = +\frac{kHA_2}{\lambda} e^{-x/\lambda}$

$x \to -\infty \quad h = h_1^* \to A_1 = 0$

$x \to +\infty \quad h = h_2^* \to B_2 = 0$

$x = 0 \quad h(x=0^-) = h(x=0^+)$

$Q_x(x=0^-) = Q_x(x=0^+)$

$h(x=0^-) = h(x=0^+) \quad h_1^* + B_1 = h_2^* + A_2$

$Q_x(x=0^-) = Q_x(x=0^+) \quad -\frac{kHB_1}{\lambda} = \frac{kHA_2}{\lambda} \to A_2 = -B_1$

$h_1^* + B_1 = h_2^* - B_1$

$B_1 = \frac{h_2^* - h_1^*}{2} \qquad A_2 = \frac{h_1^* - h_2^*}{2}$

$x \le 0 \quad h = h_1^* + \frac{h_2^* - h_1^*}{2} e^{x/\lambda}$

$x \ge 0 \quad h = h_2^* + \frac{h_1^* - h_2^*}{2} e^{-x/\lambda}$

$x = 0 \to h = h_1^* + \frac{h_2^* - h_1^*}{2} = \frac{1}{2}(h_1^* + h_2^*)$