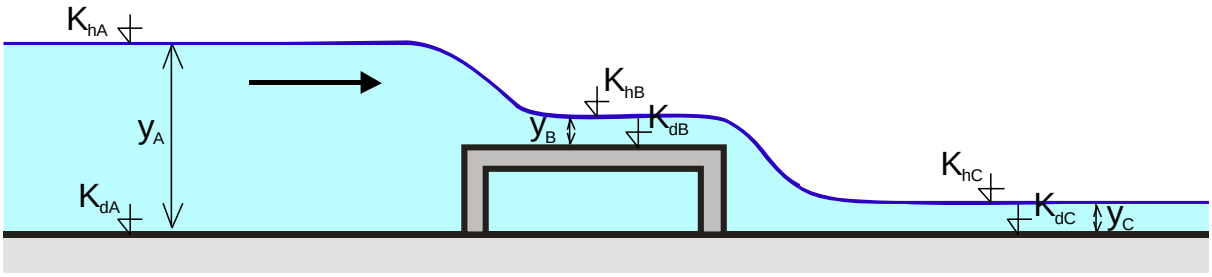
Surname, name	group (HYAE)	teacher	date of measurement

DETERMINATION OF REGIME (TYPE) OF OPEN CHANNEL FLOW

Task

Under condition of one constant discharge evaluate in two cross sections determined by the teacher: cross sectional velocity, critical depth, Froud number and regime of flow in laboratory flume of width of 80 mm.



Procedure of measurement:

1) Using the needle gauge located on detachable base, measure levels K_d of the flume bottom in two profiles (levels corresponding with the bottom of plexiglass flume $K_{dA} = K_{dC} = 48{,}35$ cm).
2) After starting the pump and firming up the system, measure water levels in given two profiles (measurements K_h). The water levels measure using the needle gauge again.
3) Using the volume flow-meter and stopwatch, determine discharge Q.

Formulas to evaluate measurements:

volume discharge [m^3s^{-1}]: $Q = \frac{V}{t}$, where V ... volume of water [m^3], t ... time [s]

mean velocity [$m \cdot s^{-1}$]: $v = \frac{Q}{S}$, where

Q ... discharge [m^3s^{-1}],

S ... cross sectional area[m^2], for rectangle $S = y \cdot b$ (y ... depth = difference of readings of water level and bottom on the needle gauge, b ... width of flume, b = 0,08 m)

Froud number: $Fr = \frac{v}{\sqrt{g \cdot y_s}}$, where

g ... gravity acceleration

y_s ... mean depth in cross section ($y_s = \frac{S}{B}$, B ... width in water level)

critical depth for rectangular cross section, α = 1,0: $y_k = \sqrt[3]{\frac{Q^2}{g \cdot b^2}}$

volume [l] – flow-meter		
time [s]		
discharge [$l \cdot s^{-1}$]		
bottom level - needle gauge reading [cm]	profil 1 (K_{d1})	
	profil 2 (K_{d2})	
water level - needle gauge reading [cm]	profil 1 (K_{h1})	
	profil 2 (K_{h2})	
depth [m]	profil 1 (y_1)	
	profil 2 (y_2)	
velocity v [$m \cdot s^{-1}$]	profil 1	
	profil 2	
critical depth y_k [m]	profil 1	
	profil 2	
Froud number Fr [-]	profil 1	
	profil 2	
regime of flow (critical, sub/super-critical)	profil 1	
	profil 2	