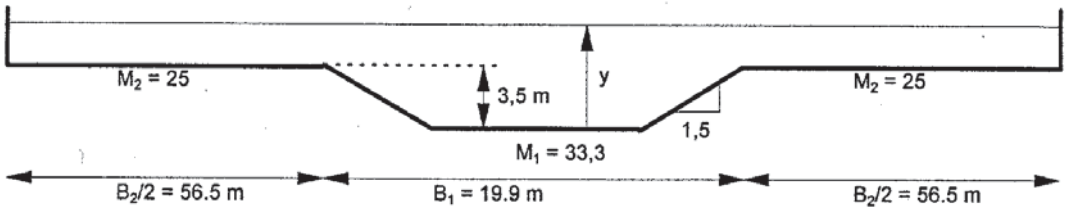
Homework 1

Problem 1. Discharge curve



a) Find the discharge curve (y = f(Q)) for the cross-section above when I_b = 1/250 and y < 5 meters.

b) Use the graphical method to find critical depth (Fr = f(Qc)) in the channel.

c) When is the flow supercritical and when is it subcritical?

It is adviceable to use a spreadsheet.

Problem 2. Velocity profiles

In a 50 meter wide channel with rectangular cross-section, point velocity measurements are done. The water depth is measured to be 2.1 meters, and the water velocity 0.3 meters from the bed is measured to 0.54 m/s, while the water velocity 1.9 meters from the bed is measured to 0.81 m/s.

a) Find the water discharge and the bed roughness.

b) In what depth will the water velocity be equal to the average water velocity over the depth?