

Tutorial 8

1. In a trapezoidal channel the bed width is 4 m, lateral wall slopes are both 1:1, and the discharge is 22.5 m³/s. The channel has three **long** parts with slopes $S_01=0.0004$, $S_02=0.009$, $S_03=0.004$, and Manning's coefficients of $n_1=0.015$, $n_2=0.012$, and $n_3=0.015$, respectively. Identify the type of water surface profile along the channel.
2. In a rectangular channel ($n=0.017$) of width 3 m and slope 0.02, the discharge is 11.3 m³/s. A small dam is installed to increase the water depth upstream to 2.9 m just before the dam. Show that the channel is steep and the dam leads to a hydraulic jump upstream. Identify the type of water surface profile and distance between the hydraulic jump and the dam.
3. In a rectangular concrete channel ($n=0.013$) of width 2.0 m and slope 0.0018, the water discharge is 3 m³/s. Determine the width of the throat of the Venturi flume such that a hydraulic jump will be formed in the downstream part of the channel with a sequent depth equal to the depth of uniform flow. Calculate the increased water depth upstream of the Venturi flume.