Homework # 6, CE 313, Winter 2012

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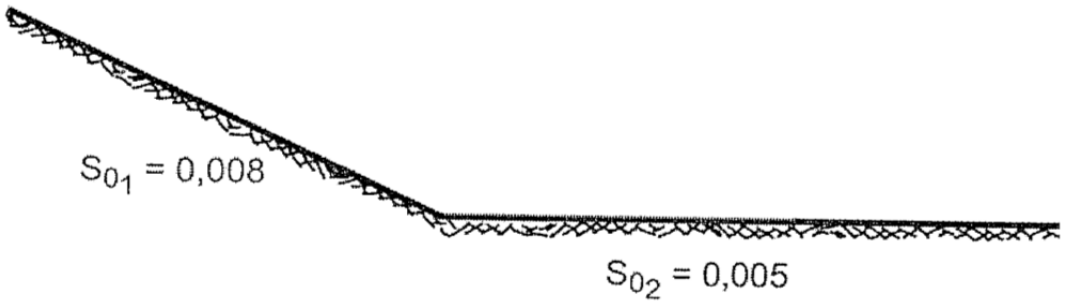
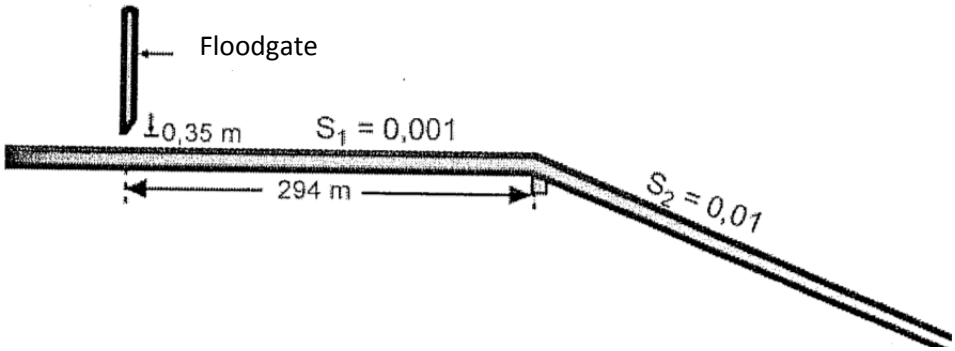
1. A trapezoidal canal with a bottom width of 1.5 m, a side slope Z = 1, has a longitudinal slope of 0.4‰ and n = 0.025. If the water depth in section 1 is 1.52 m and in section 2, 592 m downstream of section1, the water depth is 1.68 m, determine the flow discharge in the canal. **Answer:** Q = 1. 99 m^3/s

2. A rectangular canal, which longitudinal profile is shown below, conveys a flow discharge of 1.5 m^3/s. If the bottom width is 2 m and the Manning's roughness coefficient is 0.014, Determine:
   (a) Name of flow profiles
   (b) Water surface profile (try to determine at least 5 important points in the profile). You can use Annel2 (Matlab script).



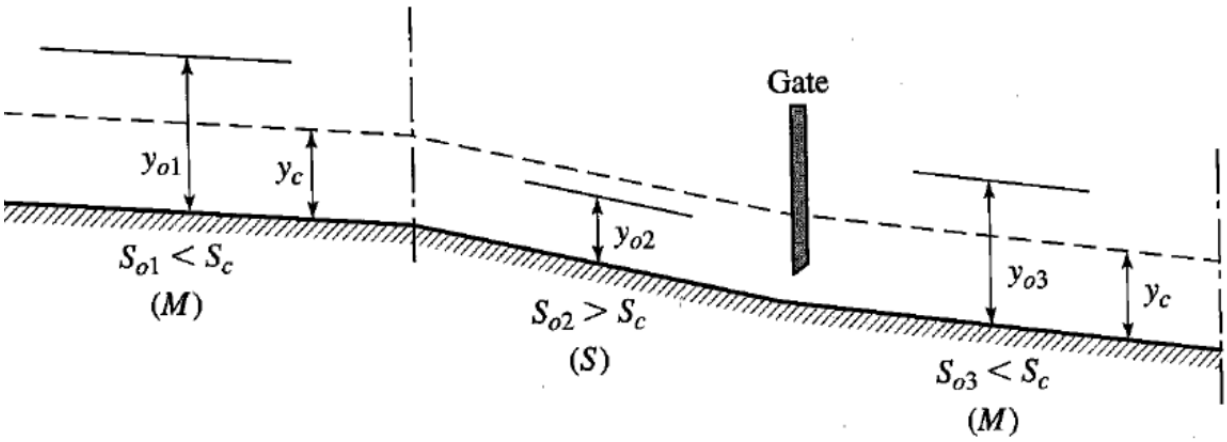
Longitudinal profile of canal

3. A rectangular canal with a bottom width of 2 m, coefficient of roughness n = 0. 015 conveys a flow rate of 2.5 m^3/s and has the longitudinal profile depicted below. In this canal there is a floodgate that has an opening of 0.35 m. Determine (a) name of flow profiles, (b) Water surface profile in the entire canal (upstream and downstream of floodgate)

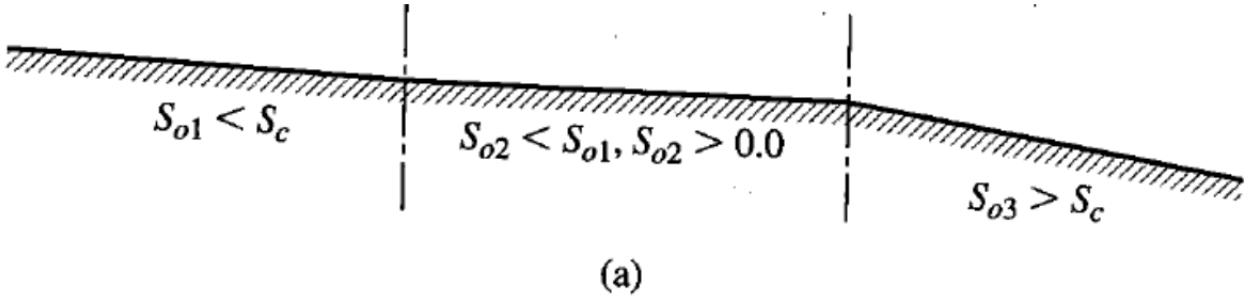


Longitudinal profile of the canal

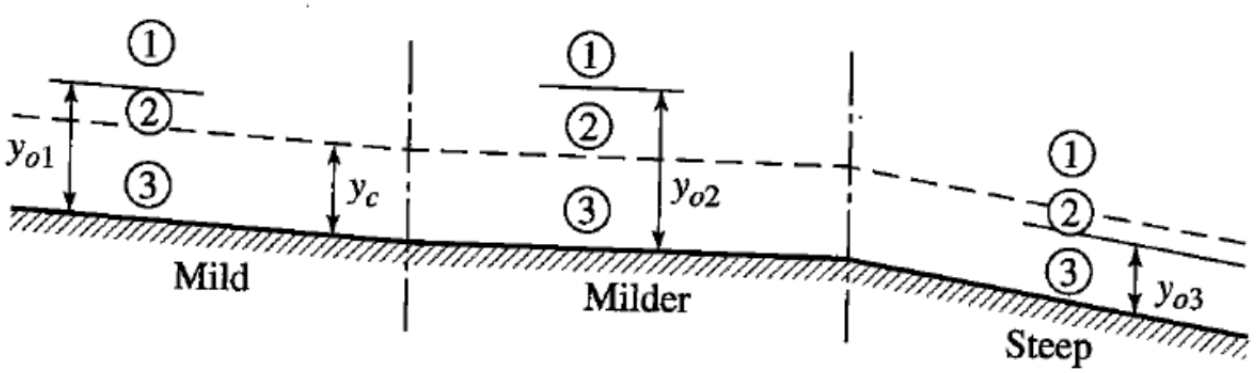
4. Draw the water surface profile for the channel below. Name each of the flow profiles. **Note**: y_o is the normal flow depth, S_o is the reach longitudinal slope, S_c is the critical slope.
   If $S_o > S_c$ flow is supercritical
   If $S_o = S_c$ flow is critical
   If $S_o < S_c$ flow is subcritical



5. Draw the water surface profile for the channel below. Name each of the flow profiles. Note that Figures (a) and (b) below are equivalent. You need to work in Figure (b) only.

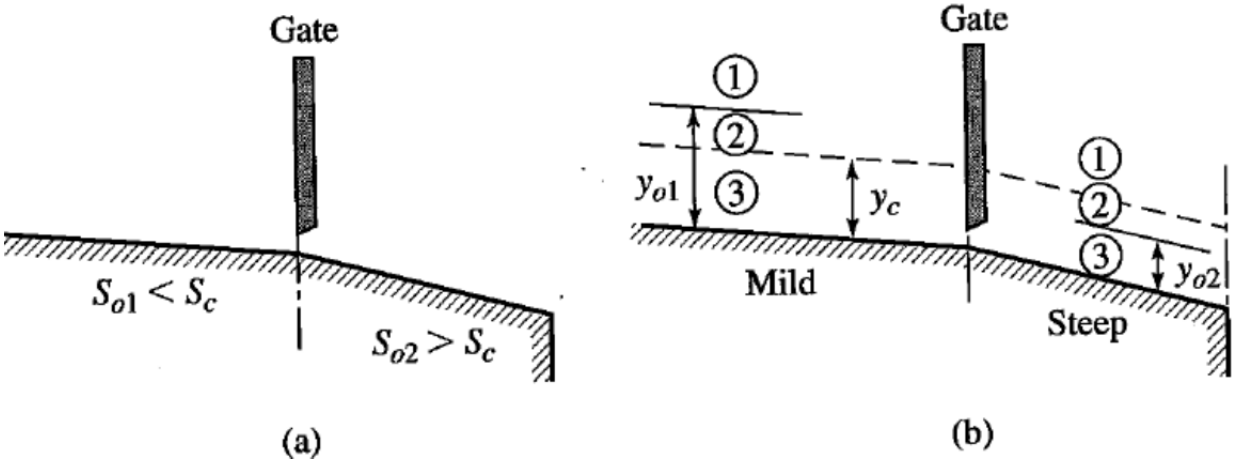


(a)

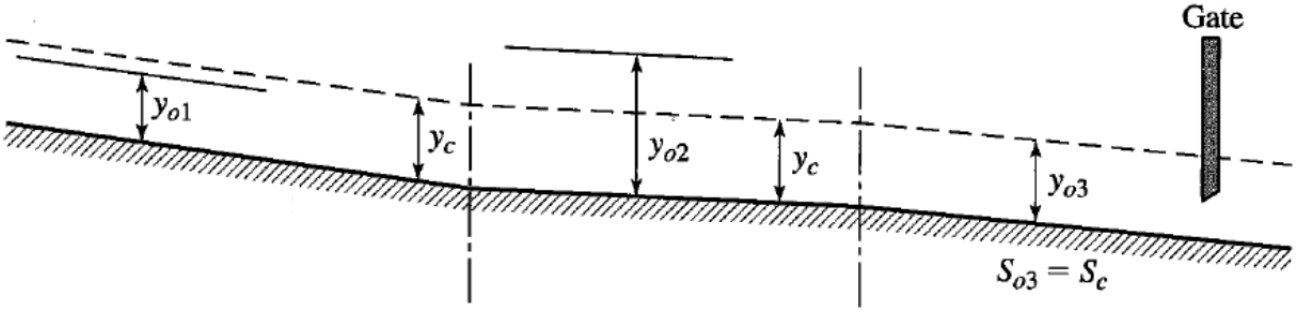


(b)

6. Draw the water surface profile for the channel below. Name each of the flow profiles. Note that Figures (a) and (b) below are equivalent. You need to work in Figure (b) only.



7. Draw the water surface profile for the channel below. Name each of the flow profiles.



8. Draw the water surface profile for the channel below. Name each of the flow profiles.