NPTEL Online Certification

COMPUTATIONAL HYDRAULICS
Week 11 : Assignment Solution
July 24-October 13, 2017

NOTE: Attempt **ALL** questions. Make suitable assumptions, wherever necessary.

1. Consider the problem statement in 'Surface Water Hydraulics: Unsteady 1D Channel Flow'. What is the maximum discharge (w.r.t. time) for at x = 4000 m from internal junction node in Channel reach 3 of the network. Use the code unsteady_1D_channel_network_with_reverse_cfg1.sci. Keep the channel segment and other parameters unchanged.

- **163.54251**

2. Consider the problem statement in 'Surface Water Hydraulics: Unsteady 1D Channel Flow'. What is the maximum discharge (w.r.t. time) for at x = 4000 m from internal junction node in Channel reach 3 of the network. Use the code unsteady_1D_channel_network_with_reverse_cfg1.sci. Take time step as 50 and keep other parameters unchanged.

- **163.97054**

3. Consider the problem statement in 'Surface Water Hydraulics: Unsteady 1D Channel Flow'. Use the code unsteady_1D_channel_network_with_reverse_cfg1.sci. Take the channel segment as 50 m and keep other parameters unchanged. Now what is the maximum discharge (w.r.t. time) for at x = 4000 m from internal junction node in Channel reach 3 of the network.

- **163.55291**

4. Consider the problem statement in 'Surface Water Hydraulics: Unsteady 1D Channel Flow'. Use the code unsteady_1D_channel_network_with_reverse_cfg1.sci. Keep the channel segment and other parameters unchanged. Change both Preiesmann scheme parameters (θ, ψ) to 0.75. Compare the hydrographs and depth variation.

- **For 0.75, the fluctuations reduce in the falling limb of hydrograph and depth curve**

5. If both Preiesmann scheme parameters $(\theta, \psi)$are set as 1, the scheme becomes

- **Completely Implicit**

6. For the lecture 'Surface Water Hydraulics: Unsteady 2D Surface Flow', the scheme used is

- **Conditionally stable**
- **Conditionally unstable**

7. For the Hardy-Cross problem, If the flow depth is reduced 10, what is discharge through pipe 3.

- **0.0123384**