NPTEL Online Certification

COMPUTATIONAL HYDRAULICS
Week 9 : Assignment Solution
July 24-October 13, 2017

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

1. Find out the value of flow-depth y at x=200m for the GVF problem discussed in the lecture by using the following Butcher Tableau,

$$
\begin{array}{c|cc}
0 & 0 & 0 \\
\frac{2}{3} & \frac{1}{3} & \frac{1}{3} \\
\hline
 & \frac{1}{4} & \frac{3}{4}
\end{array}
$$

This is a Third order Runge-Kutta (RK3) approximation. (Hint: Modify the RK4_implicit.sci)

- **0.6404425**

2. Find out the value of flow-depth y at x=150m for the GVF problem discussed in the lecture by using the following Butcher Tableau,

$$
\begin{array}{c|cc}
0 & \frac{1}{4} & -\frac{1}{4} \\
\frac{2}{3} & \frac{1}{4} & \frac{5}{12} \\
\hline
 & \frac{1}{4} & \frac{3}{4}
\end{array}
$$

This is a Third order Runge-Kutta (RK3) approximation. (Hint: Modify the RK4_implicit.sci)

- **0.7269076**

3. Find out the value of flow-depth y at x=100m for the GVF problem discussed in the lecture by using the following Butcher Tableau,

$$
\begin{array}{c|cc}
\frac{1}{3} & \frac{1}{3} & 0 \\
1 & 1 & 0 \\
\hline
 & \frac{3}{4} & \frac{1}{4}
\end{array}
$$

This is a Third order Runge-Kutta (RK3) approximation. (Hint: Modify the RK4_implicit.sci)

- **0.7629011**

4. Find out the value of flow-depth y at x=75m for the GVF problem discussed in the lecture by using the following Butcher Tableau,

$$
\begin{array}{c|cc}
\frac{1}{3} & \frac{5}{12} & -\frac{1}{12} \\
1 & \frac{3}{4} & \frac{1}{4} \\
\hline
 & \frac{3}{4} & \frac{1}{4}
\end{array}
$$

This is a Third order Runge-Kutta (RK3) approximation. (Hint: Modify the RK4_implicit.sci)

- **0.775069**