

Hydrostatic Reconstructed Force Scheme and Application to the non unique Riemann Solutions for the Shallow Water Equations

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The well known shallow water equations are system of hyperbolic equations, for which a Riemann problem can be defined. For a general hyperbolic system a Riemann problem can be defined as an initial value problem with piecewise constant initial data with one discontinuity. In case of the shallow water equations, the incorporation of the source term, e.g. the bathymetry, is an ongoing topic. Since the classical fractional step method fails to preserve steady states in case of such a source term, we will take a look at the so called hydrostatic reconstruction introduced by Audusse in 2004.

It has been shown by Andrianov and was later expanded by Han and Warnecke, that the shallow water equations with a Riemann problem can develop multiple solutions. Furthermore Andrianov has shown that different finite volume schemes approach different solutions. We will compare hydrostatic reconstructed schemes, especially Toro's Force scheme, with other *well-balanced* schemes. Using the exact solutions from Han and Warnecke, we take a look at which solutions will be approached.

This is joint work with Ee Han (formerly University of Bremen)

References:

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