High order accurate discontinuous Galerkin methods for the shallow water equations on unstructured triangular meshes

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Abstract

Shallow-water equations with a non-flat bottom topography have been widely used to model flows in rivers and coastal areas. These equations have steady-state solutions in which the flux gradients are non-zero but exactly balanced by the source term. Therefore extra care must be paid to approximate the source term numerically. Another important difficulty arising in these simulations is the appearance of dry areas, and standard numerical methods may fail in the presence of these areas.

In this presentation, we will talk about recently developed high-order discontinuous Galerkin methods on unstructured triangular meshes, which can preserve the steady-state exactly, and at the same time are positivity preserving without loss of mass conservation. Some numerical tests are performed to verify the positivity, well-balanced property, highorder accuracy, and good resolution for smooth and discontinuous solutions.

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