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Space-time SUPG finite element computation of shallow-water flows with moving shorelines.

(English) [Zbl 1398.76126](#)

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Summary: We show that combination of the Deforming-Spatial-Domain/Stabilized Space-Time and the Streamline-Upwind/Petrov-Galerkin formulations can be used quite effectively for computation of shallow-water flows with moving shorelines. The combined formulation is supplemented with a stabilization parameter that was originally introduced for compressible flows, a compressible-flow shock-capturing parameter adapted for shallow-water flows, and remeshing based on using a background mesh. We present a number of test computations and provide comparisons to theoretical results, experimental data and results computed with nonmoving meshes.

MSC:

76M10 Finite element methods applied to problems in fluid mechanics

74F10 Fluid-solid interactions (including aero- and hydro-elasticity, porosity, etc.)

76D05 Navier-Stokes equations for incompressible viscous fluids

76Z05 Physiological flows

65Y05 Parallel numerical computation

Cited in **15** Documents

Keywords:

shallow-water equations; spacetime finite element method; SUPG formulation; moving shorelines; background mesh; wave runup

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