

Well-balanced second-order finite element approximation of the shallow water equations with friction.

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I will present a continuous finite element technique for the approximation of the shallow water equations with topography and friction. The method is explicit, second-order, parameter-free, well-balanced (with respect to rest and sliding steady states), and positivity-preserving. The novelties of the method are the explicit treatment of the friction term, the robust approximation of dry states, and a commutator-based, high-order, entropy-viscosity. The computational method is illustrated on various benchmark tests. I will also talk about a second-order technique to preserve local convex invariant domains of some hyperbolic systems with source term.