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A Finite Volume Method for Simulating Long Waves

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In this work, a finite volume algorithm used for solving systems of hyperbolic systems of conservation laws is applied to solve the Nonlinear Shallow Water Equations (NSWE) with source terms present. The discretization is based on Roe's approximate Riemann solver, that has been properly modified to work robustly in the presence of topography and dry states. The method is applied to obtain numerical simulations of (a) long wave run-up on coasts of arbitrary profile with wet/dry transitions and, (b) long wave generation and run-up due to landslides or more general due to topography changes. We present numerical results for benchmark problems (emphasis is given to the problems from the Third International Workshop on Long-Wave Runup Models) in one and two dimensions and compare with well known analytical solutions and experimental data (were available).