

# Computational Methods for Hyperbolic Systems.

## Preservation of Global and Local Invariants

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**Abstract.** We focus our discussion on computational methods which preserve invariants of nonlinear first-order hyperbolic systems. Two examples are order. We present a family of entropy conservative discretizations as an example for preservation of global, nonlinear invariants. The interplay between entropy variables, symmetry and finite-element discretizations will be clarified. The resulting schemes enjoy — or suffer, dispersive oscillations. From the latter point of view, one is enforced to add entropy dissipation. This leads to the competition between dissipation and high resolution, and we shall describe recent trends based on nonlinear discretization in direction of smoothness. We conclude with a general recipe for incompressible numerical fluxes as an example for preservation of local invariants.