



Terrance Pendleton

Iowa State University

On Invariant-Preserving Finite Difference Schemes for the Camassa-Holm Equation and the Two-Component Camassa-Holm System

tpendle@iastate.edu

We develop and test novel invariant-preserving finite difference schemes for both the *Camassa-Holm* (CH) equation and one of its 2-component generalizations (2CH). The considered PDEs are strongly nonlinear, admitting soliton-like peakon solutions, which are characterized by a slope discontinuity at the peak in the wave shape, and therefore suitable for modeling both short wave breaking and long wave propagation phenomena. The proposed numerical schemes are shown to preserve two invariants, momentum and energy. Hence they produce wave solutions numerically with a smaller phase error over longer time periods compared to those by other conventional methods.