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Stability and dynamical properties of Cooper-Shepard-Sodano compactons ANDRES CARDENAS, New York University, BOGDAN MIHAILA, Los Alamos National Laboratory, FRED COOPER, Santa Fe Institute, AVADH SAXENA, Los Alamos National Laboratory — Extending a Pade approximant method used recently to study the properties of compactons in the Rosenau-Hyman (RH) equation [see B. Mihaila et al. Phys. Rev. E 81, 056708 (2010)], we study the numerical stability of single compactons of the Cooper-Shepard-Sodano (CSS) equation and their pairwise interactions. The CSS equation has a conserved Hamiltonian which has allowed several approaches for studying analytically the nonlinear stability of the solutions. We study three different compacton solutions and find they are numerically stable. Similar to the collisions between RH compactons, the CSS compactons reemerge with the same coherent shape when scattered. The time evolution of the small-amplitude ripple resulting after scattering depends on the values of the parameters characterizing the corresponding CSS equation. The simulation of the CSS compacton scattering requires a much smaller artificial viscosity to obtain numerical stability than in the case of RH compacton propagation.

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