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Elastic Collisions among Peakon Solutions for the Camassa–Holm Equation

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The purpose of this poster is to study the dynamics of the interaction among a special class of solutions of the one-dimensional Camassa–Holm equation. The equation yields soliton solutions whose identity is preserved through nonlinear interactions. These solutions are characterized by a discontinuity at the peak in the wave shape and are thus called peakon solutions. We apply a particle method to the Camassa–Holm equation and show that the nonlinear interaction among the peakon solutions resembles an elastic collision, i.e., the total energy and momentum of the system before the peakon interaction is equal to the total energy and momentum of the system after the collision. From this result, we provide several numerical illustrations, which support the analytical study, as well as showcase the merits of using a particle method to simulate solutions to the Camassa–Holm equation under a wide class of initial data.