

Exact Solutions of a Fully Nonlinear Two-Fluid Model

Alexei Cheviakov (Department of Mathematics and Statistics,
University of Saskatchewan)

Abstract. The nonlinear Choi–Camassa model describes internal waves in a horizontal channel containing two non-mixing fluid layers. We derive an equivalence transformation leading to a special dimensionless form of the system, with the number of constant physical parameters reduced from five to one. A dimensionless ordinary differential equation describing traveling wave solutions is analyzed; it is shown to admit several multi-parameter families of exact closed-form solutions. These solutions correspond to periodic, solitary, and kink-type bidirectional traveling waves of the Choi–Camassa model.

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