

Abstract Submitted
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Interactions of breathers and solitons of the extended Korteweg de Vries equation¹ C.M. SHEK, University of Hong Kong, R.H.J. GRIMSHAW, Loughborough University, E. DING, K.W. CHOW, University of Hong Kong — A popular model for the evolution of weakly nonlinear, weakly dispersive waves in the ocean is the extended Korteweg – de Vries equation (eKdV), which incorporates both quadratic and cubic nonlinearities. The case of positive cubic nonlinearity allows for both solitons of elevation and depression, as well as breathers (pulsating modes). Multi-soliton solutions are computed analytically, and will yield expressions for breather-soliton interactions. Both the soliton and breather will retain their identities after interactions, but suffer phase shifts. However, the details of the interaction process will depend on the polarity of the interacting soliton, and have been investigated by a computer algebra software. This highly time dependent motion during the interaction process is important in nonlinear science and physical oceanography. As the dynamics of the current and an evolving internal oceanic tide can be modeled by eKdV, this knowledge is relevant to the temporal and spatial variability observed in the oceanic internal soliton fields.

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