

Elliptic Function Compactons in a class of Generalized Korteweg-DeVries Equations

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Abstract

We study the class of generalized Korteweg-DeVries equations derivable from the Lagrangian: $L(l, p) = \int \left(\frac{1}{2} \varphi_x \varphi_t - \frac{(\varphi_x)^l}{l(l-1)} + \alpha (\varphi_x)^p (\varphi_{xx})^2 \right) dx$, where the usual fields $u(x, t)$ of the generalized KdV equation are defined by $u(x, t) = \varphi_x(x, t)$. This class contains compactons, which are solitary waves with compact support. In this paper we obtain the elliptic function compact solitary wave solutions to this class of equations. We prove a theorem that all the solitary wave solutions of the equations of motion obey a simple relationship between the Energy, Momentum and velocity of the solitary wave

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