

Fifth-order KdV-type equations

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Sep. 22-23, 2012

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Abstract

We briefly review the results on real-valued fifth-order Korteweg-Vde Vries (KdV)-type equations and discuss spatially periodic complex-valued solutions of the KdV-type equations. The aim is at several fundamental issues including the existence, uniqueness and finite-time blowup problems. Special attention is paid to the Kawahara equation, a fifth-order KdV-type equation. When a Burgers dissipation is attached to the Kawahara equation, we establish the existence and uniqueness of the Fourier series solution with the Fourier modes decaying algebraically in terms of the wave numbers. We also examine a special series solution to the Kawahara equation and prove the convergence and global regularity of such solutions associated with a single mode initial data. In addition, finite-time blowup results are discussed for the special series solution of the Kawahara equation.