

Title: Numerical Computations of Generalized Korteweg-de Vries (KdV) equations

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Abstract:

We consider the following generalized Korteweg-deVries (KdV) equation

$$u_t + au_x + 2buu_x + cu_{xxx} - du_{xx} = 0.$$

The above equation is the generalized version of the KDV equation

$$u_t + u_x + 2uu_x + \delta u_{xxx} = 0.$$

Here $u = u(x, t)$ is a scalar function of $x \in R$ and $t \geq 0$, while $\delta > 0$ is a parameter. This equation is used to model the unidirectional propagation of water waves. The scalar u represents the amplitude of the wave.

In this presentation we investigate the various limits of the solutions of the generalized equation as one or more of the parameters as a, b, c and d tend to zero. This is carried out through numerical computations using the pseudo-spectral method.