



Unusual KdV-like waves

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The set of the Korteweg-de Vries-like equations $u_t + (|u|^p)_x + u_{xxx} = 0$ is analyzed. Here p is arbitrary positive constant. Equations with $p = 2$ (classical KdV equation) and $p = 3$ with replacing $|u|$ to u (modified KdV equation) are well studied due to full integrability of both equations. “Modular” KdV equation with $p = 1$ describes elastic waves in bimodular media. The Shamel equation with $p = 3/2$ describes ion-acoustic waves with resonant electrons. In the case of the density stratified fluid parameter p can be equal to 4 and higher. Log-KdV equation with replacing $|u|^p$ to $u \log |u|$ describes the granular chains with Hertzian interacted forces. The properties of the periodic (cnoidal) and solitary waves in the KdV-like system are discussed. Some results of modulational instability of the periodic waves and forming of unusual rogue waves are presented.

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