

Analysis and Applied Mathematics Seminar

Stability of solitary wave solutions to a coupled system

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Abstract: Considered here is a system $U_t + U_x - U_{xxt} + (\nabla H(U))_x = 0$ of nonlinear dispersive equations, where $U = U(x, t)$ is an \mathbb{R}^2 -valued function, and ∇H is the gradient of a homogeneous polynomial function $H : \mathbb{R}^2 \rightarrow \mathbb{R}$ of degree $p \geq 3$. We present existence of explicit solitary wave solutions. Using the idea by Bona, Chen and Karakashian and exploiting the accurate point spectrum information of the associated Schrödinger operator, we derive a simple algebraic condition for stability of the explicit solitary wave solutions, which improves the stability results previously obtained by Pereira and also observe the criteria for instability of solitary wave solutions.

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