
Existence and multiplicity of solutions for a system of coupled NLS-KdV equations

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Abstract

Along this talk, will be focused the attention on the system of coupled NLS-KdV equations,

$$(S) \begin{cases} if_t + f_{xx} - \beta fg + |f|^2 f = 0, & x \in \mathbb{R}, \quad t > 0 \\ g_t + g_{xxx} + gg_x - \frac{1}{2}\beta(|f|^2)_x = 0, & x \in \mathbb{R}, \quad t > 0, \end{cases}$$

where i denotes the complex unit, $f(x, t) \in \mathbb{C}$, $g(x, t) \in \mathbb{R}$, $\beta \in \mathbb{R}$ and $|f|, |g| \rightarrow 0$ as $|x| \rightarrow \infty$. This system appears in phenomena of interactions between short and long dispersive waves, arising in fluid mechanics, such as the interactions of capillary - gravity water waves. Indeed, f represents the short-wave, while g stands for the long-wave

The main results that we will be shown deals with existence of positive bound and ground states for the corresponding stationary system when one looks for solitary-traveling wave solutions of (S) .

The results presented in this talk are contained in the following papers.

[1] E. Colorado,
Existence of bound and ground states for a system of coupled nonlinear Schrödinger-KdV equations. To appear in *Comptes rendus - Mathématique*, DOI:10.1016/j.crma.2015.03.011.

[2] E. Colorado,
On the existence of bound and ground states for a system of coupled nonlinear Schrödinger-KdV equations. Preprint ArXiv:1411.7283v3.

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