Nonlinear Sciences > Exactly Solvable and Integrable Systems

Resonant solitons from the 3×3 operator

D. J. Kaup, Robert A. Van Gorder

(Submitted on 20 Jun 2011)

Resonant solitons of the 3×3 operator are studied. The scattering data of this operator contains four transmission coefficients, two in each half complex ζ-plane, where ζ is the spectral parameter. For anti-hermitian symmetry of the potential, the two transmission coefficients in the lower half plane (LHP) become equal to the complex conjugates of those in the upper half plane (UHP). The bound state scattering data for this operator consists in part of the zeros of these two transmission coefficients. Of particular interest is that class of soliton solutions when the two transmission coefficients have exactly equal eigenvalues, which gives rist to "resonant solitons". They arise from a bifurcation which is caused by the algebraic structure of the 3×3 scattering matrix. We detail the asymptotics of this solution, showing that the latter contains the well known parametric interactions of "up-conversion" and "down-conversion". Lastly, we explain how this equality of eigenvalues in different transmission coefficients can be seen to be a nonlinear resonance condition.

Comments:	24 pages, no figures
Subjects:	**Exactly Solvable and Integrable Systems (nlin.SI)**; Pattern Formation and Solitons (nlin.PS)
MSC classes:	37K40, 34L25, 35Q51, 35Q60
Cite as:	**arXiv:1106.3943 [nlin.SI]**
	(or **arXiv:1106.3943v1 [nlin.SI]** for this version)

Submission history

From: David Kaup [view email]

[v1] Mon, 20 Jun 2011 15:29:00 GMT (35kb)

Which authors of this paper are endorsers?