

Truncated Painlevé Expansion – A Unified Approach to Exact Solutions and Dromion Interactions of (2+1)-Dimensional Nonlinear Systems

Ramaswamy Radha^{a,b,c}, Xiao Yan Tang^a, and Sen Yue Lou^{a,c}

^a Department of Physics, Shanghai Jiao Tong University, Shanghai, 200030, China

^b Department of Physics, Govt. College for Women, Kumbakonam-612001, India

^c Center of Nonlinear Science, Ningbo University, Ningbo, 315211, China

Reprint requests to R. R.; E-mail: radha_rawaswamy@yahoo.com

Z. Naturforsch. **62a**, 107 – 116 (2007); received November 15, 2006

In this paper, we formulate a method wherein we harness the results of the Painlevé analysis to generate the solutions of the (2+1)-dimensional Ablowitz-Kaup-Newell-Segur system completely in terms of the arbitrary functions. This method is mainly based on the results of the truncated Painlevé expansion. Different types of interactions among dromions are deeply understood both analytically and numerically. Especially, different from the traditional viewpoint, we point out that the soliton (dromion) fission and fusion may be an approximate phenomenon.

Key words: Truncated Painlevé Expansion; Exact Solutions; Dromion Interactions.