Accepted Manuscript

Title: Solitons, Lax pair and infinitely-many conservation laws for a high-order nonlinear Schrödinger equation in an optical fiber

Author: Xue-Hui Zhao Bo Tian Yong-Jiang Guo

PII: S0030-4026(16)31576-5

DOI: http://dx.doi.org/doi:10.1016/j.ijleo.2016.12.026

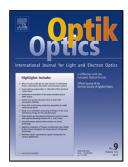
Reference: IJLEO 58656

To appear in:

Received date: 26-10-2016 Revised date: 9-12-2016 Accepted date: 9-12-2016

Please cite this article as: Xue-Hui Zhao, Bo Tian, Yong-Jiang Guo, Solitons, Lax pair and infinitely-many conservation laws for a high-order nonlinear Schr*ddoto*dinger equation in an optical fiber, <![CDATA[Optik - International Journal for Light and Electron Optics]] > (2016), http://dx.doi.org/10.1016/j.ijleo.2016.12.026

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Solitons, Lax pair and infinitely-many conservation laws for a high-order nonlinear Schrödinger equation in an optical fiber

Xue-Hui Zhao¹, Bo Tian^{2,3,*}, Yong-Jiang Guo²

- 1. Automation school, Beijing University of Posts and Telecommunications, Beijing 100876, China
- 2. School of Science, Beijing University of Posts and Telecommunications, Beijing 100876, China
- 3. State Key Laboratory of Information Photonics and Optical Communications, Beijing 100876, China

Abstract

Under investigation in this paper is a high-order nonlinear Schrödinger equation in an optical fiber. Lax pair and infinitely-many conservation laws are derived via the symbolic computation. By virtue of the Darboux transformation, one-, two- and three-soliton solutions are derived. Propagation and interaction of the solitons are illustrated graphically: Velocity of the soliton is linearly related to the higher-order dispersion coefficients, while amplitude of the soliton does not depend on them at all. Head-on interaction between the two bidirectional solitons as well as overtaking and oscillating interaction between the two unidirectional solitons are presented. For the interactions among the three solitons, we display two head-on and one overtaking interactions along with three overtaking interactions. Graphical analysis shows that each interaction between the two solitons is elastic, and each interaction among the three solitons is pairwise elastic.

PACS numbers: 05.45. Yv; 47.35. Fg; 02.30. Jr

Keywords: Optical fiber; High-order nonlinear Schrödinger equation; Darboux transformation; Lax pair; Infinitely-many conservation laws; Solitons

^{*}Corresponding author, with e-mail address as tian_bupt@163.com

Download English Version:

https://daneshyari.com/en/article/5025890

Download Persian Version:

https://daneshyari.com/article/5025890

<u>Daneshyari.com</u>