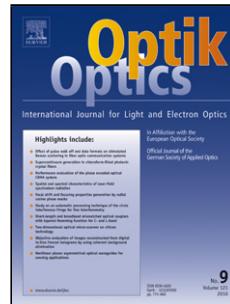# Accepted Manuscript

Title: Symbolic computation on tunable nonautonomous solitons in inhomogeneous NLS system with generalized external potential

Authors: S. Vijayalekshmi, A. Mahalingam, M.S. Mani Rajan

Please cite this article as: S.Vijayalekshmi, A.Mahalingam, M.S.Mani Rajan, Symbolic computation on tunable nonautonomous solitons in inhomogeneous NLS system with generalized external potential, Optik - International Journal for Light and Electron Opticshttp://dx.doi.org/10.1016/j.ijleo.2017.07.048

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.

Symbolic computation on tunable nonautonomous solitons in inhomogeneous NLS system with generalized external potential

S. Vijayalekshmi[a], A. Mahalingam[a], and M.S. Mani Rajan[b*]

[a]*Department of Physics, Anna University, Chennai, India.*
[b]*Department of Physics, Anna University, University College of Engineering, Ramanathapuram, India.*

ABSTRACT

In this paper, propagation of optical solitons in a generalized nonautonomous nonlinear Schrödinger equation with more generalized external potential is investigated. We constructed the Lax pair for this system and obtained two-soliton solutions by employing Darboux transformation. Using the two-soliton solution, soliton propagation in inhomogeneous nonlinear media with generalized external potential is investigated for different forms of variable coefficients which are important in the soliton control.

Key words: Optical solitons; Inhomogeneous systems; Nonlinear Schrodinger equation; Lax pair; Darboux Transformation.

1. Introduction

In recent years the study of optical solitons has attracted extensive attention due to its interesting features and potential applications in long distance communications. This is because optical solitons arises as a result of the exact balance between the linear effect of group velocity dispersion (GVD) and self phase modulation (SPM), which are the two detrimental effects in long distance optical communication systems [1]. The optical soliton in a dielectric fiber was firstly proposed by Hasegawa and Tappert [2] and verified experimentally by Mollenauer et al [3]. The best known equation used to describe the propagation of optical solitons is the nonlinear Schrödinger (NLS) equation which appears in many branches of physics and applied mathematics such as nonlinear quantum field theory, condensed matter, plasma physics and nonlinear optics etc. Although the above systems describe the dynamics of optical solitons in nonlinear optical media, they are highly idealized in the sense that real media are always inhomogeneous. In the past years, a lot of