ABSTRACTS

August 15, 2017 Tuesday

Hall 3 17:00-18:20 Session 12

Category: Conservation Laws
Abstract No: 1132

NUMERICAL ANALYSIS OF RELATIVISTIC BURGERS MODEL ON FLRW SPACETIME

Baver Okutmustur [1]
METU Mathematics Ankara-Turkey [1]

A relativistic generalization of Burgers equations was proposed by LeFloch, Makhlof, and Okutmustur and then investigated on Schwarzschild, de Sitter, Schwarzschild--de Sitter and Schwarzschild--Anti--de Sitter spacetimes. In this work, we extend these analysis to a Friedmann--Lemaitre--Robertson--Walker (FLRW) background. This problem is more challenging due to the existence of nontrivial spatially homogeneous solutions. We derive the relativistic Burgers model under consideration and determine its spatially homogeneous solutions. We design a numerical scheme based on a finite volume technique, which is well-preserving in the sense that spatially homogeneous solutions are preserved at the discrete level of approximation. Numerical experiments demonstrate the efficiency of the proposed method for solutions that may contain shock waves.

Category: Conservation Laws
Keywords: alpha-helix proteins, nonlinear self-adjointness, Conservation laws.
Abstract No: 1095

DYNAMICS OF OPTICAL SOLITONS AND CONSERVATION LAWS FOR THE MODIFIED NONLINEAR SHRODINGER'S EQUATION FOR DAVYDOV SOLITONS IN ALPHA-HELIX PROTEINS

Mustafa Inc [1], *Aliyu Isa Aliyu* [1], Abdullahi Yusif [1], Dumitru Baleanu [2]
Firat University Mathematics Elazig-Turkey [1] Cankaya University Mathematics Ankara-Turkey [2]

This paper employed two integration techniques to obtain soliton solutions of the modified nonlinear Shrödinger's equation for Davydov Solitons in alpha=helix proteins. These are the modified F-Expansion method and the principle of undetermined coeffcients. These yielded dark optical solitons, bright optical soliton, combined optical solitons, periodic singular solitons and singular optical solitons. The constraint conditions that naturally fall out of the solution structure which guarantee the existence of these solitons are also presented. We studied the equation by analyzing a system of partial differential equations (PDEs) obtained by decomposing the alpha-helix protein equation into real and imaginary components. We derive the Lie point symmetry generators of the system and prove that the underlying system is nonlinearly self-adjoint with an explicit form of a differential substitution satisfying the nonlinear self-adjoint condition. Then we use these facts to construct a set of local conservation laws (Cls) for the system using the general Cls theorem presented by Ibragimov. Some interesting gures for the acquired solutions are also presented.