

Solitons In Molecular Systems Mathematics And Its Applications

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Solitons In Molecular Systems Mathematics

Solitons

Solitons are the solutions of classical non-linear equations They are analogous to extended classical particles They became popular in early 1970- sThe theory of solitons is attractive and exciting, it brings together many branches of mathematics and theoretical physics

Semiclassical Solitons in Strongly Correlated Systems of ...

Solitons are conspicuous manifestations of nonlinear interactions in a variety of physical systems (see eg [51, 73]) Originally introduced in hydrodynamics of classical fluids, they were later observed in a variety of other systems, including plasma physics, nonlinear optics, magnetism, dynamics of molecular systems It is currently understood

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soliton[2-4] Motivated by the robustness of the solitons in the presence of perturbations, Davydov with coworkers had put forward a soliton theory of long-haul transfer of charge (electrons) and energy (excitons, ie intramolecular vibrational excitations) in molecular chains [3,4], based on the coupling with long-wave acoustic phonons The

A Numerical Method for Finding Multiple Co-Existing ...

A Numerical Method for Finding Multiple Co-Existing Solutions to Nonlinear Cooperative Systems Xianjin Chena, Jianxin Zhoua,*and Xudong Yaob a Department of Mathematics, Texas A&M University, College Station, TX 77843 b Department of Mathematics, University of Connecticut, Storrs, CT 06269 Abstract In this paper, a local min-orthogonal method is developed to solve cooperative nonlinear elliptic

Annals of Physics

Solitons are conspicuous manifestations of nonlinear interactions in a variety of physical systems (see eg [50,71]) Originally introduced in hydrodynamics of classical fluids, they were later observed in a variety of other systems, including plasma physics, nonlinear optics, magnetism, dynamics of molecular systems

TOPOLOGICAL OPTICS Solitons and topological waves

mathematics and physics In mathematics, it gave rise to a new field of study: integrable nonlinear wave systems These are nonlinear partial differential equations that are exactly solvable and possess an infinite number of symmetries and conservation laws In physics, researchers have observed solitary waves and solitons

Discrete spatial solitons in a diffraction-managed ...

Discrete solitons have been demonstrated to exist in a wide range of physical systems [2-5] For example, atomic chains [6,7] (discrete lattices) with an on-site cubic nonlinearities, molecular crystals[8], biophysical systems [9], electrical lattices [10], and recently in arrays of coupled nonlinear optical waveguides [11,12] An array of

Discrete nonlocal nonlinear Schrödinger systems ...

systems: Integrability, inverse scattering and solitons Mark J Ablowitz¹, Xu-Dan Luo² and Ziad H Musslimani^{3,4} ¹ Department of Applied Mathematics, University of Colorado, Campus Box 526, Boulder, CO 80309-0526, United States of America ² Department of Mathematics, State University of New York at Buffalo, Buffalo,

Ground States of Coupled Nonlinear Oscillator Systems

- 3 - [29] Weinstein, Michael I, Excitation thresholds for nonlinear localized modes on lattices, Nonlinearity 12, no 3 (1999): 673 [30] Greiner, Markus, Olaf Mandel, Tilman Esslinger, Theodor W Hänsch, and Immanuel Bloch, Quantum phase transition from a superfluid to a Mott insulator in a gas of ultracold atoms, nature 415, no 6867 (2002): 39-44

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Don Lancaster's Hardware Hacker June, 1994 Second law violations Soliton wave references Superb CD ROM directory Santa Claus Machine update Several hacker opportunities

Methods for discrete solitons in nonlinear lattices

Discrete solitons have been demonstrated to exist in a wide range of physical systems, eg, atomic chains @3,4# ~discrete lattices! with on-site cubic nonlinearities, molecular crystals @5#, biophysical systems @6#, electrical lattices @7#, and recently in arrays of ...

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Adiabatic dynamics and numerical simulations of solitons ...

Department of Mathematics, Alabama A & M University, Normal, AL-35762 ____ ABSTRACT The adiabatic dynamics of solitons in α -helix proteins are studied in this paper The soliton perturbation theory is applied to conduct this research work The type of nonlinearity that is

Dynamics of Davydov Solitons in α -Helix Proteins

Jan 04, 2009 · Dynamics of Davydov Solitons in α -Helix Proteins Keka C Biswas and Jacquelyn Gillespie Department of Science, Wesley College Dover, DE-19901, USA Fayequa Majid Department of Mathematics, Alabama A & M University Normal, AL-35762, USA Matthew Edwards School of Arts and Sciences, Alabama A & M University Normal, AL-35762, USA Anjan Biswas

FOCUS ISSUE: Optical Solitons—Perspectives and ...

Department of Applied Mathematics, University of Colorado, Campus Box 526, Boulder, Colorado 80309-0526 the history of solitons and the field of integrable systems, a brief overview of the development of molecular biology, quantum mechanics, geology, meteorology, ocean-

Complex functions as lumps of energy Funciones complejas ...

2 Solitons Nonlinear science has developed strongly over the past 40 years, touching upon every discipline in both the natural and social sciences Nonlinear systems appear in mathematics, physics, chemistry, biology, astronomy, meteorology, engineering, economics and many more [2, 3]

Discrete gap solitons in a diffraction-managed waveguide array

arXiv:nlin/0302025v1 [nlinPS] 12 Feb 2003 Discrete gap solitons in a diffraction-managed waveguide array PG Kevrekidis¹, BA Malomed² and Z Musslimani³ ¹Department of Mathematics and Statistics, University of Massachusetts, Amherst MA 01003-4515, USA ²Department of Interdisciplinary Studies, Faculty of Engineering, Tel Aviv University, Tel Aviv, Israel

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Biological Networks Complex Systems And Interdisciplinary ...

systems to which we will attend to in this review complex systems science in biomedicine thomas s systems science involving the application of physics mathematics engineering and computational methods and techniques to the study of biomedicine including nonlinear dynamics at the molecular