

The Discrete Nonlinear Schrödinger Equation

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We review work on the Discrete Nonlinear Schrödinger (DNLS) equation over the last two

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decades. 1. Introduction The Discrete Nonlinear Schrödinger (DNLS) equation describes a particularly simple model for a lattice of coupled anharmonic oscillators. In one spatial dimension, the equation in its simplest form is

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We study a fractional version of the two-dimensional discrete nonlinear Schrödinger (DNLS) equation, where the usual discrete Laplacian is replaced by its fractional form that depends on a fractional exponent s that interpolates between the case of an identity operator ($s = 0$) and that of the usual discrete 2D Laplacian ($s = 1$).

Discrete nonlocal nonlinear Schrödinger systems ...

beam propagation 1 . The model is described by the discrete nonlinear Schrödinger DNLS equation with the coefficient of tunnel coupling between sites c_t rapidly and strongly varying in time: $i u_{n,t} + 1 c_t u_{n+1} + u_{n-1} + 2 u_n u_n = 0, 1$ where 1. The analysis exhibits the existence of a type of discrete spatial optical solitons with beam width and peak

The Discrete Nonlinear Schr Dinger

Abstract In this paper we review a number of recent developments in the study of the Discrete Nonlinear Schrödinger (DNLS) equation. Results concerning

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ground and excited states, their construction, stability and bifurcations are presented in one and two spatial dimensions.

The Discrete Nonlinear Schrödinger Equation ...

Discrete nonlinear Schrödinger (DNLS) equations can be used to model numerous phenomena in atomic, molecular, and optical physics.

The Discrete Nonlinear Schrödinger Equation [PDF]

The Nonlinear Schrödinger (NLS) equation is a prototypical dispersive nonlinear partial differential equation (PDE) that has been derived in many areas of physics and analyzed mathematically for over 40 years. Historically the essence of NLS equations can be found in the early work of Ginzburg and Landau (1950) and Ginzburg (1956) in their study of the macroscopic theory of superconductivity, and also of Ginzburg and Pitaevskii (1958) who subsequently investigated the theory of superfluidity.

Nonlinear Schrödinger systems: continuous and discrete ...

Local and global existence of localized solutions of a discrete nonlinear Schrödinger (DNLS) equation, with arbitrary on-site nonlinearity, is proved. In particular, it is shown that an initially localized excitation persists localized during infinite time.

Breathers and multibreathers in a periodically driven ...

Using several kinds of coordinate transformations, we standardize the noncanonical symplectic structure of the Ablowitz–Ladik model (A–L model) of nonlinear Schrödinger equation (NLSE), then we employ some symplectic scheme to simulate the solitons motion and test the evolution of the discrete invariants of the A–L model and also the conserved quantities of the original NLSE.

Solitons in strongly driven discrete nonlinear Schrödinger ...

From a more general perspective, we view these DNLS multihump solutions as homoclinic orbits of a higher-dimensional map thereby providing a possible mechanism for explaining the occurrence of similar structures called discrete (multi-) breathers found in a wide variety of one-dimensional nonlinear lattices.

The two-dimensional fractional discrete nonlinear ...

This book constitutes the first effort to summarize a large volume of results obtained over the past 20 years in the context of the Discrete Nonlinear Schrödinger equation and the physical settings that it describes. It contains an introduction to the model, its systematic derivation and its

On localized solutions of discrete nonlinear Schrödinger ...

Discrete Nonlinear Schrödinger Equations with Time-Dependent Coefficients (Management of Lattice Solitons)

The Discrete Nonlinear Schrödinger Equation: Mathematical ...

“The collection contains 22 articles on various aspects of the discrete nonlinear Schrödinger equation The book provides a comprehensive and useful guide to the substantial mathematical and physical literature on the discrete nonlinear Schrödinger equation, both for novices and experts in the field.” (Karsten Matthies, Mathematical Reviews, Issue 2012 e)

Nonlinear Schrödinger equation - Wikipedia

“The collection contains 22 articles on various aspects of the discrete nonlinear Schrödinger equation The book provides a comprehensive and useful guide to the substantial mathematical and physical literature on the discrete nonlinear Schrödinger equation, both for novices and experts in the field.” (Karsten Matthies, Mathematical Reviews, Issue 2012 e)

THE DISCRETE NONLINEAR

SCHRODINGER EQUATION ~ { 20 YEARS ON

In theoretical physics, the nonlinear Schrödinger equation is a nonlinear variation of the Schrödinger equation. It is a classical field equation whose principal applications are to the propagation of light in nonlinear optical fibers and planar waveguides and to Bose–Einstein condensates confined to highly anisotropic cigar-shaped traps, in the mean-field regime. Additionally, the equation appears in the studies of small-amplitude gravity waves on the surface of deep inviscid water; the ...

Discrete and Continuous Nonlinear Schrödinger Systems ...

The IST technique applies to continuous and discrete nonlinear Schrödinger (NLS) equations of scalar and vector type. This work presents a detailed mathematical study of the scattering theory, offers soliton solutions, and analyzes both scalar and vector soliton interactions.

Modeling Optical Technologies with Continuous and Discrete ...

The discrete coupled nonlinear Schrödinger (DCNLS) hierarchy associated with a discrete (3×3) matrix spectral problem is derived, which are composed of the positive and negative flows. Utilizing the characteristic polynomial of Lax matrix for the DCNLS hierarchy, we introduce a trigonal curve with

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three infinite points and three zero points, from which we establish the associated Baker–Akhiezer function and meromorphic functions.

Bing: The Discrete Nonlinear Schrödinger

usual discrete in this paper we review a number of recent developments in the study of the discrete nonlinear Schrödinger equation results concerning ground and excited states their construction stability and bifurcations are presented in one and two spatial dimensions this equation is also known as discrete nonlinear Schrödinger

THE DISCRETE NONLINEAR SCHRÖDINGER EQUATION: A SURVEY OF

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Among such a discrete equation is the well known discrete nonlinear Schrödinger $i \frac{dq_n}{dt} = q_{n+1} + q_{n-1} + |q_n|^2 q_n$, (1.2) where $q_n(t)$ describes a time-dependent discrete envelope function, dot stands for time derivative and n is an integer. This model successfully predicts numerous important phenomena in the physical and biological sciences.

The Application of the Theory of Trigonal Curves to the ...

feedback concerning discrete nonlinear Schrödinger (DNLS) equations and other aspects of an academic nature. The hospitality at San Diego State university during a research visit in January 2008 is appreciated.

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I am happy to have experienced the turbulence of PhD life with my colleague

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