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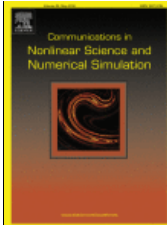
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Volume

Issue

Page

Под: Advanced search



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Communications in Nonlinear Science and Numerical Simulation
Volume 34, Pages 1-230 (May 2016)

Articles 1 - 20

[Articles in Press](#)

[Open Access articles](#)

[Volumes 31 - 39 \(2016\)](#)

[Volume 39](#)

[In Progress](#) (October 2016)

[Volume 38](#)

[In Progress](#) (September 2016)

[Volume 37](#)

pp. 1-386 (August 2016)

[Volume 36](#)

pp. 1-564 (July 2016)

[Volume 35](#)

pp. 1-190 (June 2016)

[Volume 34](#)

pp. 1-230 (May 2016)

[Volume 33](#)

pp. 1-270 (April 2016)

[Volume 32](#)

pp. 1-316 (March 2016)

[Volume 31, Issues 1-3](#)

pp. 1-196 (February 2016)

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Page IFC

[PDF \(35 K\)](#)

Research Articles

☐ [Nonlinear characteristics analysis of vortex-induced vibration for a three-dimensional flexible tube](#) Original Research Article

Pages 1-11

Zhipeng Feng, Naibin Jiang, Fenggang Zang, Yixiong Zhang, Xuan Huang, Wanjun Wu

[Abstract](#)

[Close research highlights](#)

[PDF \(2132 K\)](#)

Highlights

- A three-dimensional numerical model for flexible tube vibration induced by cross flow is proposed.
- The dynamic behavior and response characteristic of the tube are investigated. Meanwhile, the limit cycle and bifurcation of lift coefficient and displacement are analyzed.
- Amplitude response, trajectory, phase difference, fluid force coefficient and vortex shedding frequency are investigated.
- A quasi-upper branch occurs in the fluid-structure interaction system, and there is no bifurcation of lift coefficient and lateral displacement occurred in three dimensional flexible tube submitted to uniform turbulent flow.

☐ [Effects of the spike timing-dependent plasticity on the synchronisation in a random Hodgkin-Huxley neuronal network](#) Original Research Article

Pages 12-22

R.R. Borges, F.S. Borges, E.L. Lameu, A.M. Batista, K.C. Iarosz, I.L. Caldas, R.L. Viana, M.A.F. Sanjuán

[Abstract](#)

[Close research highlights](#)

[PDF \(1113 K\)](#)

Highlights

- We have studied the effects of spike timing-dependent plasticity on synchronisation.
- We have chosen, as local dynamics, the Hodgkin-Huxley model.
- The transition for synchronisation depends on the network architecture and the external perturbation level.

☐ [Finding zeros of nonlinear functions using the hybrid parallel cell mapping method](#) Original Research Article

Pages 23-37

Fu-Rui Xiong, Oliver Schütze, Qian Ding, Jian-Qiao Sun

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[Abstract](#) | [Close research highlights](#) | [PDF \(1277 K\)](#)

Highlights

- Develop a new method for finding zeros of nonlinear vector functions
- Extend the method to find stability boundary conditions
- Compute zeros of challenging nonlinear functions
- Compute stability boundaries in potential fields

- ☐ [Lie symmetries and conservation laws for the time fractional Derrida–Lebowitz–Speer–Spohn equation](#) Original Research Article
Pages 38–44

Wenjuan Rui, Xiangzhi Zhang

[Abstract](#) | [Close research highlights](#) | [PDF \(339 K\)](#)

Highlights

- By using the Lie group analysis method of fractional differential equations, we derive Lie symmetries for the time fractional Derrida–Lebowitz–Speer–Spohn (FDLSS) equation with Riemann–Liouville derivative.
- In a particular case of scaling transformations, we transform the FDLSS equation into a nonlinear ordinary fractional differential equation.
- Based on the new conservation laws theorem and the fractional generalization of the Noether operators, we derived conservation laws for the FDLSS equation.

- ☐ [Network and external perturbation induce burst synchronisation in cat cerebral cortex](#) Original Research Article
Pages 45–54

Ewandson L. Lameu, Fernando S. Borges, Rafael R. Borges, Antonio M. Batista, Murilo S. Baptista, Ricardo L. Viana

[Abstract](#) | [Close research highlights](#) | [PDF \(1255 K\)](#)

Highlights

- We have built a network of networks according to the connections observed in the cat cortical areas.
- We study how inputs drive the synchronous behaviour in this cat brain-like network.
- We showed that the network and the external perturbation induce burst synchronisation in cat cerebral cortex.

- ☐ [Defects formation and wave emitting from defects in excitable media](#) Original Research Article
Pages 55–65

Jun Ma, Ying Xu, Jun Tang, Chunni Wang

[Abstract](#) | [Close research highlights](#) | [PDF \(4350 K\)](#)

Highlights

- Defects formation mechanism in neuronal network under bursting state is observed.
- Wave formation and travelling in network are detected.
- Wave competition on forcing and defects are investigated.

- ☐ [Rogue wave formation under the action of quasi-stationary pressure](#) Original Research Article
Pages 66–76

A.A. Abrashkin, O.E. Oshmarina

[Abstract](#) | [Close research highlights](#) | [PDF \(1027 K\)](#)

Highlights

- A vortical model of rogue wave on deep water is proposed.
- The wind action is simulated by the pit of pressure on the free surface.
- The fluid motion is described by an exact solution of 2D hydrodynamic equations.
- Values optimal for rogue wave formation are found numerically.

- ☐ [Quantum signature of discrete breathers in a nonlinear Klein–Gordon lattice with nearest and next-nearest neighbor interactions](#) Original Research Article

Pages 77-85

Bing Tang, De-Jun Li

[Abstract](#) | [Close research highlights](#) | [PDF \(1162 K\)](#)

Highlights

- Both semiclassical and quantum descriptions of breathers are considered.
- The effect of the long-range interaction is investigated.
- The semiclassical analytical solutions of discrete breathers are gotten.
- The energy spectrum of the system containing two quanta is calculated.

☐ [Onto resolving spurious wave reflection problem with changing nonlocality among various length scales](#) Original Research Article
Pages 86-122

R. Rahman, J.T. Foster

[Abstract](#) | [Close research highlights](#) | [PDF \(2374 K\)](#)

Highlights

- The wave reflection can be mitigated between different nonlocal models by using fraction power law based kernel.
- Seamless local/nonlocal bridging can be established by incorporating power law based handshake region.
- Heterogeneous materials at different length scale can be modeled using power law based kernels without having any spurious wave reflection problem.

☐ [Dynamics of the Kuramoto equation with spatially distributed control](#) Original Research Article
Pages 123-129

Iliia Kashchenko, Sergey Kaschenko

[Abstract](#) | [Close research highlights](#) | [PDF \(335 K\)](#)

Highlights

- Equation with spatially distributed control is studied by asymptotic methods.
- Two distribution functions: almost symmetric and strongly asymmetric relative to zero.
- For small control coefficient stability of running waves are studied.
- For large control it is shown that dynamics described by behavior of quasi-normal form.

☐ [Stability analysis of electrostatically actuated nano/micro-beams under the effect of van der Waals force, a semi-analytical approach](#) Original Research Article
Pages 130-141

Amir R. Askari, Masoud Tahani

[Abstract](#) | [Close research highlights](#) | [PDF \(779 K\)](#)

Highlights

- A new procedure for pull-in analysis of beam-type N/MEMS under vdW force has been introduced.
- This procedure able us to represent analytical and semi-analytical solutions for pull-in problems.
- This method can extract all pull-in parameters simultaneously.
- It is found that this new method agrees better than previous ones with FE results.
- Some closed-form expressions are also presented for vdW and electrical pull-in parameters.

☐ [Nonautonomous rogue waves and 'catch' dynamics for the combined Hirota-LPD equation with variable coefficients](#) Original Research Article
Pages 142-153

Fajun Yu

[Abstract](#) | [Close research highlights](#) | [PDF \(2394 K\)](#)

Highlights

- The nonautonomous rogue waves are investigated for combined Hirota-LPD equation.

We study multi-rogue wave solutions employing the generalized Darboux transformations.

- There are possibilities to 'catch' rogue waves through manipulating nonlinear and gain functions.

- ☐ [On the convergence of a new reliable algorithm for solving multi-order fractional differential equations](#) Original Research Article
Pages 154-164

Esmail Hesameddini, Azam Rahimi, Elham Asadollahifard

[Abstract](#) | [Close research highlights](#) | [PDF \(1217 K\)](#)

Highlights

- We introduce a new algorithm for solving multi-order fractional differential equations.
- A comparison between the presented method with some other well-known methods for solving M-FDEs is provided.
- We present an elegant way to show the convergence analysis of the RVIM.

- ☐ [On designing stochastic sampled-data controller for master–slave synchronization of chaotic Lur'e system via a novel integral inequality](#) Original Research Article
Pages 165-184

Kaibo Shi, Xinzhi Liu, Hong Zhu, Shouming Zhong

[Abstract](#) | [Close research highlights](#) | [PDF \(2033 K\)](#)

Highlights

- Less conservative synchronization conditions are obtained by using a novel approach.
- Based on the extended Wirtinger inequality, a newly time-dependent Lyapunov–Krasovskii functional is constructed by introducing two independent random variable parameters.
- By using a novel free-matrix-based integral inequality, a desired estimator gain can be achieved.
- Numerical simulation examples are given to illustrate the effectiveness and superiorities of the proposed method.

- ☐ [An immune system–tumour interactions model with discrete time delay: Model analysis and validation](#) Original Research Article
Pages 185-198

Monika Joanna Piotrowska

[Abstract](#) | [Close research highlights](#) | [PDF \(691 K\)](#)

Highlights

- A generalised immune system–tumour interactions model with time delay is proposed.
- The mathematical properties and model dynamic are analytically studied.
- Model is validated with the sets of the experimental data.
- The biological conclusions are formulated.

- ☐ [An impulsive state feedback control model for releasing white-headed langurs in captive to the wild](#) Original Research Article
Pages 199-209

Weijian Xu, Lansun Chen, Shidong Chen, Guoping Pang

[Abstract](#) | [Close research highlights](#) | [PDF \(2372 K\)](#)

Highlights

- We apply the theory of differential equation to protect white-headed langurs.
- An impulsive state feedback control model for white-headed langurs is proposed.
- The model describes the behavior of releasing the langurs in captive to the wild.
- We study the existence and the stability of the system's order-1 periodic solution.
- Population migration and artificial breeding can protect the population effectively.

- ☐ [The Wronskian solution of the constrained discrete Kadomtsev–Petviashvili hierarchy](#) Original Research Article

Pages 210-223

Maohua Li, Jingsong He

[Abstract](#)[Close research highlights](#)[PDF \(290 K\)](#)**Highlights**

- By means of the gauge transformation, the Wronskian solutions of the DNLS equations have been given.
- We have got the bright soliton and the dark-bright soliton solutions of the cdKP hierarchy.

☐ **On considering the influence of recovered individuals in disease propagations** Original Research Article
Pages 224-230

A.L.S. Moraes, L.H.A. Monteiro

[Abstract](#)[Close research highlights](#)[PDF \(498 K\)](#)**Highlights**

- Immune adults can catalyze the interaction among susceptible and sick children.
- However, adults take care of sick children, shortening the convalescence period.
- These features are considered in an epidemic SIR model.
- The proposed model allows the existence of multiple stable steady-states.
- Its predictions are evaluated from data related to varicella incidence in Europe.

☐ **Editors continued**
Page III[PDF \(34 K\)](#)[< Previous vol/iss](#) | [Next vol/iss >](#)

Articles 1 - 20

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