



ISSN: 1749-3889 ( print )  
1749-3897 (online)

**Bimonthly**

Vol.21 (2016) No.1  
February

England, UK  
[www.NonlinearScience.org.uk](http://www.NonlinearScience.org.uk)  
[www.InterNonlinearScience.org](http://www.InterNonlinearScience.org)

# *International Journal of* **Nonlinear Science**

Edited by *International Committee for Nonlinear Science, WAU*  
Published by *World Academic Union (World Academic Press)*

Academic House, 113 Mill Lane, Wavertree Technology Park, Liverpool, L13 4AH, UK  
[www.WorldAcademicUnion.com](http://www.WorldAcademicUnion.com); [www.WorldAcademicPress.com](http://www.WorldAcademicPress.com)

## **CONTENTS**

---

- 3 Fractal Interpolation Surfaces and Perturbations on Vertical Scaling Factors**  
*M. Guru Prem Prasad, Md. Nasim Akhtar*
- 13 How to Determine the Critical Conditions of China's Renewable Energy Investment Decision?**  
*Min Fu, Peilin Xu, Lixin Tian, Zhiyan Shi, Xiaomeng Gu*
- 27 Solving the Duffing Equation with the Homotopy Mapping Method**  
*You Zhou, Zhiyang Zeng, Pengcheng Ye*
- 31 The Valuation of Photovoltaic Power Generation Based on Real Options**  
*Jianglai Pan, Lixin Tian, Haifang Shan*
- 37 Discrete Control Systems of Fractional Order**  
*Jagan Mohan Jonnalagadda, D. Purnima, G. V. S. R. Deekshitulu*
- 47 Dynamics of a Duopoly Game with Heterogeneous Players and Time Delay**  
*Fei Xu, Zhanwen Ding, Honglin Yang*
- 54 The Impact of Energy Consumption Structure on China's Environmental Quality**  
*Li Wang, Xuelian Zhao, Xinghua Fan*
- 60 A Note On Topological Conjugacy For Perpetual Points**  
*Awadhesh Prasad*

Copyright © World Academic Union (World Academic Press)

---

## International Journal of Nonlinear Science (IJNS)

### Bibliographic

**ISSN:** 1749-3889 (print), 1749-3897 (online), *Bimonthly*

**Edited** by International Editorial Committee of Nonlinear Science, WAU

**Published** by World Academic Union (World Academic Press)

**Publisher Contact:** Academic House, 113 Mill Lane

Wavertree Technology Park, Liverpool L13 4AH, England, UK

Email: publishing@wau.org.uk, publishing@WorldAcademicUnion.com

URL: [www. World Academic Union .com](http://www.WorldAcademicUnion.com)

### Contribution enquiries and submitting

Paper(s) should be submitted through the online system. To submit papers, please visit

[www.NonlinearScience.org.uk](http://www.NonlinearScience.org.uk)

[www.InterNonlinearScience.org](http://www.InterNonlinearScience.org)

### Editorial Board

**Editor in Chief:** *Boling Guo*, Institute of Applied Physics and Computational Mathematics, Beijing, 100088, China; IJNS@ujs.edu.cn

**Co-Editor in Chief:** *Lixin Tian*, Nonlinear Scientific Research Center, Jiangsu University, Zhenjiang, Jiangsu, 212013; China; tianlx@ujs.edu.cn, IJNS@ujs.edu.cn

### Standing Members of Editorial Board:

**Ghasem Alizahdeh Afrouzi**, Department of Mathematics, Faculty of Basic Sciences, Mazandaran University, Babolsar, Iran; afrouzi@umz.ac.ir

**Stephen Anco**, Department of Mathematics, Brock University, 500 Glenridge Avenue St. Catharines, ON L2S 3A1, Canada; sanco@brocku.ca

**Adrian Constantin**, Department of Mathematics, Lund University, 22100 Lund, adrian@maths.lth.se Sweden; adrian.constantin@math.lu.se ,

**Ying Fan**, Department of Management Science, Institute of Policy and Management, Chinese Academy of Sciences, Beijing 100080, China, yfan@casipm.ac.cn.

**Juergen Garloff**, University of Applied Sciences/ HTWG Konstanz, Faculty of Computer Science, Postfach 100543, D-78405 Konstanz, Germany; garloff@htwg-konstanz.de

**Tasawar Hayat**, Department of mathematics, Quaid-I-Azam University, Pakistan, pensy\_t@yahoo.com

**Yong Jiang**, William Lee Innovation Center, University of Manchester, Manchester, M60 1QD UK; jianguk@hotmail.com

**Zhujun Jing**, Institute of Mathematics, Academy of Mathematics and Systems Sciences, Chinese Academy of Science, Beijing, 100080, China; jingzj@math03.math.ac.cn

**Yue Liu**, Department of Mathematics, University of Texas, Arlington, TX 76019, USA; yliu@uta.edu

**Zengrong Liu**, Department of Mathematics, Shanghai University, Shanghai, 201800, China; Zrongliu@online.sh.cn

**Norio Okada**, Disaster Prevention Research Institute, Kyoto University , n\_okada@drs.dpri.kyoto-u.ac.jp

**Jacques Peyriere**, Université Paris-Sud, Mathématiques, b â t. 42591405 ORSAY Cedex , France;

Jacques.Peyriere@free.fr,

Jacques.Peyriere@math.u-psud.fr

**Weiyi Su**, Department of Mathematics, Nanjing University, Nanjing, Jiangsu, 210093, China; suqiu@nju.edu.cn

**Konstantina Trivisa**, Department of Mathematics, University of Maryland College Park, MD20472-4015, USA; trivisa@math.umd.edu

**Yaguang Wang**, Department of Mathematics, Shanghai Jiao Tong University, Shanghai, 200240, China; ygwang@sjtu.edu.cn

**Yiming Wei**, Institute of Policy and management, Chinese Academy of Science, Beijing, 100080, China; ymwei@mail.casipm.ac.cn

**Zhiying Wen**, Department of Mathematics, Tsinghua University, Beijing, 100084, China; wenzy@mail.tsinghua.edu.cn

**Lifeng Xi**, Institute of Mathematics, Zhejiang Wanli University, Ningbo 315100, China; xilf@zwu.edu.cn

**Zhenyuan Xu**, Faculty of Science, Southern Yangtze University, Wuxi , Jiangsu 214063 , China; Xu\_zhenyuan@yahoo.com

**Huicheng Yin**, Department of Mathematics, Nanjing University, Nanjing, Jiangsu, 210093, China; huicheng@nju.edu.cn

**Pingwen Zhang**, School of Mathematic Sciences, Peking University, Beijing, 100871, China; pzhang@pku.edu.cn

**Secretary:** Xuedi Wang, Xinghua Fan

### Editorial office:

Academic House, 113 Mill Lane

Wavertree Technology Park

Liverpool L13 4AH, England, UK

### Email:

china@nonlinearscience.org.uk

IJNS@ujs.edu.cn

editor@nonlinearscience.org.uk