

## Editorial

# Nonlinear Functional Analysis of Boundary Value Problems 2013

**Yong Hong Wu,<sup>1</sup> Lishan Liu,<sup>2</sup> Benchawan Wiwatanapataphee,<sup>3</sup> and Shaoyong Lai<sup>4</sup>**

<sup>1</sup> Curtin University, Perth, WA 6845, Australia

<sup>2</sup> Qufu Normal University, Qufu, Shandong 273165, China

<sup>3</sup> Faculty of Science, Mahidol University, Bangkok 10400, Thailand

<sup>4</sup> Southwestern University of Finance and Economics, Chengdu, Sichuan 610074, China

Correspondence should be addressed to Benchawan Wiwatanapataphee; benchawan.wiw@mahidol.ac.th

Received 6 January 2014; Accepted 6 January 2014; Published 16 February 2014

Copyright © 2014 Yong Hong Wu et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Nonlinear boundary value problems play a very important role in the study and control of real world nonlinear systems and the development of new technologies. In recent years, intensive research has been carried out worldwide to develop functional analysis theories and methods for tackling complex boundary value problems arising from scientific research and modelling of real world phenomena. This special issue aims to present some of the recent research developments in this field.

The issue contains twenty seven papers selected through a peer-review process. These papers cover a wide range of topics in nonlinear functional analysis including fixed-point theory, well posedness of nonlinear boundary value problems, asymptotic and stability properties of solutions, derivation of analytical solutions, construction of approximate solutions, and evaluation of the quality of the approximation. The boundary value problems tackled include partial differential equation problems, ordinary differential equation problems with fractional order derivatives and singularities, and stochastic boundary value problems. A brief review of the papers is given below under seven categories.

### (1) Well Posedness of Partial Differential Equation Boundary Value Problems

(i) In the paper titled “Nonexistence results for the Schrödinger-Poisson equations with spherical and cylindrical potentials in  $R^3$ ,” the authors study a Schrödinger-Poisson system leading to the development of two theorems giving two regi-

ons on the parameter plane where the system has no nontrivial solutions.

(ii) In the paper titled “The local strong solutions and global weak solutions for a nonlinear equation,” the author studies an extended Degasperis-Procesi model and establishes the conditions for the existence and uniqueness of local strong solutions for the underlying nonlinear equation in the Sobolev space.

(iii) In the paper titled “Global existence and uniform energy decay rates for the semilinear parabolic equation with a memory term and mixed boundary condition,” the authors establish the global existence and uniqueness of solutions for a mixed initial boundary value problem with a memory term and a generalized Lewis function by the Galerkin method. Estimates for the uniform energy decay rates are also obtained in the paper.

(iv) In the paper titled “Remarks on the blow-up solutions for the critical Gross-Pitaevskii equation,” the authors study the blow-up solutions of the critical Gross-Pitaevskii equation for modelling the Bose-Einstein condensate. The sufficient condition for the existence of solutions is established together with some qualitative properties of the minimal blow-up solutions.

(v) In the paper titled “Existence and multiplicity of nontrivial solutions for a class of fourth-order elliptic equations,” by using the fountain theorem and the local linking theorem, the authors obtain some existence and multiplicity results for a class of fourth-order elliptic equations.