Hindawi Publishing Corporation
Journal of Function Spaces
Volume 2016, Article ID 6521420, 2 pages
http://dx.doi.org/10.1155/2016/6521420

Editorial

Existence and Asymptotic Behaviour of Solutions of Differential and Integral Equations in Some Function Spaces 2016

Józef Banaś,[1] Leszek Olszowy,[1] Kishin Sadarangani,[2] Asadollah Aghajani,[3] and Mohamed A. Taoudi[4]

[1]*Department of Mathematics, Rzeszów University of Technology, Aleja Powstańców Warszawy 8, 35-959 Rzeszów, Poland*
[2]*Department of Mathematics, University of Las Palmas de Gran Canaria, Campus de Tafira Baja, 35017 Las Palmas de Gran Canaria, Spain*
[3]*Department of Mathematics, Iran University of Science and Technology, Narmak, Tehran 16846 13114, Iran*
[4]*National School of Applied Sciences, Cadi Ayyad University, 40 000 Marrakech, Morocco*

Correspondence should be addressed to Józef Banaś; jbanas@prz.edu.pl

Received 24 May 2016; Accepted 24 May 2016

From the view point of applications differential and integral equations create one of the most important subjects of mathematical sciences. In particular, differential equations are frequently applied in description of numerous events of real world and in modelling of several phenomena which appear in physics, engineering, economics, and biology and in other branches of natural and exact sciences. On the other hand, integral equations are also used in order to describe and to present some important events encountered in natural sciences, engineering, and physics.

Apart from this the theory of integral equations creates a certain complement of the theory of differential equations and simultaneously provides several handy tools used in that theory.

In the present special issue we are focussing on some qualitative aspects of both mentioned theories. The particular attention is paid to the existence of solutions of considered differential and integral equations in connection with the study of the asymptotic behaviour of those solutions. Besides some general topics investigated in the presented special issue we study also some specific problems appearing in modern theory of differential and integral equations such as stochastic Lyapunov stability, the so-called input-to-state stability, analytic solutions obtained by rapidly convergent series, periodic orbits of Keplerian-like differential systems, and a lot of other interesting topics.

Now we are going to describe in a short manner the results appearing in the papers published in this special issue.

In the paper authored by J. Ding, the blow-up and global solutions of a nonlinear reaction-diffusion equation are investigated under nonlinear boundary conditions. The considerations are located in a bounded domain with smooth boundary in the Euclidean space $\mathbb{R}^n$.

The paper of Y. Li and Y. Shang deals with the existence of positive solutions for a fully second-order boundary value problem. The basic method used in the study is that based on lower and upper solutions. The considerations of that paper are placed in the Banach space of nth order continuously differentiable functions on a bounded and closed interval.

The paper of Z. Liu et al. is devoted to the study of a second-order nonlinear difference equation. The main tools used in the investigations are the Banach fixed point principle and the Mann iterative methods with errors. The authors obtained a few results on the existence of uncountable many bounded positive solutions of the difference equation in question. A few interesting examples illustrating obtained results are included.

The paper of W. Shammakh provides a few results on the existence and uniqueness of positive solutions of a nonlinear boundary value problem for Caputo-Hadamard fractional differential equations. The author used the Banach fixed point theorem, the Leray-Schauder nonlinear alternative

theorem, and Krasnosel'skii fixed point theorem to obtain the mentioned results. Examples showing the applicability of the obtained results are included.

The paper of X. Zhang et al. is dedicated to the study of an initial value problem for stochastic evolution equations with a compact semigroup. The considerations are conducted in a real separable Hilbert space. Results on the existence of saturated mild solutions and global mild solutions are derived. An application of the results in question is indicated.

Investigations concerning boundary value problems for impulsive fractional differential equations are the main object of the paper due to P. Li et al. Results on the existence of at least triple solutions of the investigated problems are obtained by using variational methods and critical points theorem of Bonanno and Marano. Examples of the applicability are also included.

The paper of S. Li and Y. Zhu treats the planar radially symmetric Keplerian-like systems with repulsive singularities near the origin and with a semilinear growth at infinity. The main tool used in considerations is the topological degree theory. The authors showed the existence of two distinct families of periodic orbits rotating around the origin.

The paper authored by R. Kadiev and A. Ponosov studies several asymptotic properties of solutions of stochastic functional differential equations. The paper has a review character and discusses a lot of results concerning stochastic equations.

G. Gumah et al. are authors of the paper presenting an efficient modern strategy for solving some classes of uncertain integral equations occurring in physics and engineering. The methods applied in considerations are connected with orthogonal bases and reproducing kernel functions in a Hilbert functions space. Numerical examples illustrating the obtained results are also given.

We expect and simultaneously we hope that results presented in this special issue will inspire further investigations in the qualitative theory of differential, integral, and stochastic differential equations in various function spaces.

Acknowledgments

The guest editors of this special issue would like to express their immense gratitude to the authors who have submitted papers for consideration.

Józef Banaś
Leszek Olszowy
Kishin Sadarangani
Asadollah Aghajani
Mohamed A. Taoudi