FIXED POINT THEOREMS IN GENERALIZED BANACH ALGEBRAS AND APPLICATIONS

JUAN J NIETO*, ABDELGHANI OUAHAB** AND ROSANA RODRÍGUEZ-LÓPEZ*

*Departamento de Análise Matemática, Estatística e Optimización
Facultade de Matemáticas
Universidade de Santiago de Compostela, Santiago de Compostela, 15782, Spain
E-mail: juanjose.nieto.roig@usc.es, rosana.rodriguez.lopez@usc.es

**Laboratory of Mathematics, Sidi-Bel-Abbès University
PoBox 89, 22000 Sidi-Bel-Abbès, Algeria
E-mail: agh_ouahab@yahoo.fr, abdelghani.ouahab@univ-sba.dz

Abstract. In this paper, we prove some fixed point theorems in vector algebra Banach spaces. We establish the versions of Perov, Schauder and Krasnosel’skii type fixed point theorem for the sum of a contraction operator and a compact operator. The obtained results are applied to prove some theorems on the existence of solutions to nonlinear integral equations in Banach algebras. Finally, some example are given to illustrate the result.

Key Words and Phrases: Generalized Banach space, algebra Banach space, fixed point, multi-valued map, matrix, fractional integral equation.

2010 Mathematics Subject Classification: 47H10, 47H30, 54H25.

Acknowledgement. This paper was completed while A. Ouahab visited the Department of Mathematical Analysis of the University of Santiago de Compostela. He would like to thank the department for its hospitality and support. The research has been partially supported by Ministerio de Economía y Competitividad (Spain), project MTM2013-43014-P, AEI of Spain under grant MTM2016-75140-P, and Xunta de Galicia under grants GRC2015/004 and R2016-022. The authors would like to thank the anonymous referees for their careful reading of the manuscript and pertinent comments; their constructive suggestions substantially improved the quality of the work.

REFERENCES


Received: August 10, 2016; Accepted: January 18, 2018.