Fixed Point Theory, 20(2019), No. 2, 581-590
DOI: 10.24193/fpt-ro.2019.2.38
http://www.math.ubbcluj.ro/~nodeacj/sfptcj.html

GENERALIZED Φ-EPI MAPS AND TOPOLOGICAL COINCIDENCE PRINCIPLES

DONAL O'REGAN

School of Mathematics, Statistics and Applied Mathematics
National University of Ireland, Galway, Ireland
E-mail: donal.oregan@nuigalway.ie

Abstract. In this paper we present the notion of a Φ-epi map for a general class of maps and we present coincidence and homotopy properties for these maps.
Key Words and Phrases: Epi maps, coincidence, homotopy, normalization.
2010 Mathematics Subject Classification: 47H10, 54H25.

1. Introduction

The notion of a 0-epi map was introduced by Furi, Martelli and Vignoli [4] and extended in a variety of settings in the literature by other authors, see for example [5, 7, 9, 11]. In this paper we present a generalization of Φ-epi maps motivated in part, for example, from continuation theorems of set valued maps which have continuous selections [1, 2]. In particular we present coincidence, homotopy and normalization properties of these Φ-epi maps.

References

[1] R.P. Agarwal, D. O'Regan, *Continuation methods for closed, weakly closed, DKT and WDKT maps*, Computers Math. with Appl., **38**(1999), 81-88.
[2] R.P. Agarwal, D. O'Regan, *An essential map theory for U_c^κ and PK maps*, Topological Meth. Nonlinear Anal., **21**(2003), 375-386.
[3] C.D. Aliprantis, K.C. Border, *Infinite Dimensional Analysis*, Springer Verlag, Berlin, 1994.
[4] M. Furi, M. Martelli, A. Vignoli, *On the solvability of nonlinear operator equations in normed spaces*, Ann. Math. Pura Appl., **124**(1980), 321-343.
[5] G. Gabor, L. Gorniewicz, M. Slosarski, *Generalized topological essentiality and coincidence points of multivalued maps*, Set-Valued Anal., **17**(2009), 1-19.
[6] L. Gorniewicz, *Topological Fixed Point Theory of Multivalued Mappings* (second edition), Springer, Dordrecht, 2006.
[7] L. Gorniewicz, M. Slosarski, *Topological essentiality and differential inclusions*, Bull. Austral. Math. Soc., **45**(1992), 177-193.
[8] E. Michael, *A selection theorem*, Proc. Amer. Math. Soc., **17**(1966), 1404-1406.
[9] D. O'Regan, *Coincidence methods based on essential and 0-epi maps*, Acta Applicandae Math., **54**(1998), 319-330.

[10] D. O'Regan, *Fixed point theorems for the B^κ-admissible maps of Park*, Applicable Anal., **79**(2001), 173-185.
[11] D. O'Regan, *Coincidence points for multivalued maps based on Φ-epi and Φ-essential maps*, Dynamic Systems and Appl., **24**(2015), 143-154.

Received: November 28, 2016; Accepted: Jaunuary 30, 2017.