Adv. Oper. Theory 3 (2018), no. 2, 326–336
https://doi.org/10.15352/aot.1704-1153
ISSN: 2538-225X (electronic)
https://projecteuclid.org/aot

ON DIFFERENT TYPE OF FIXED POINT THEOREM FOR MULTIVALUED MAPPINGS VIA MEASURE OF NONCOMPACTNESS

NOUR EL HOUDA BOUZARA[1*] and VATAN KARAKAYA[2]

Communicated by T. Schlumprecht

Abstract. In this paper by using the measure of noncompactness concept, we present new fixed point theorems for multivalued maps. In further we introduce a new class of mappings which are general than Meir–Keeler mappings. Finally, we use these results to investigate the existence of weak solutions to an Evolution differential inclusion with lack of compactness.

References

1. N. U. Ahmed, *Semigroup theory with applications to systems and control*, Harlow John Wiley & Sons Inc. New York, 1991.
2. P. R. Akmerov, M. I. Kamenskiĭ, A. S. Potapov, A. E. Rodkina, and B. N. Sadovskiĭ, *Measures of noncompactness and condensing operators*, Translated from the 1986 Russian original by A. Iacob. Operator Theory: Advances and Applications, 55. Birkhuser Verlag, Basel, 1992.
3. J. Banas and K. Goebel, *Measure of noncompactness in Banach spaces*, Lecture Notes in Pure and Applied Mathematics, 60. Marcel Dekker, Inc., New York, 1980.
4. C. Castaing and M. Valadier, *Convex analysis and measurable multifunction*, Lecture Notes in Math. 580, Springer-Verlag New York, 1977.
5. K. Deimling, *Multivalued differential equations*, De Gruyter Series in Nonlinear Analysis and Applications, 1, Walter de Gruyter & Co., Berlin, 1992.
6. B. C. Dhage, *Some generalizations of multivalued version of Schauder's fixed point theorem with applications*, Cubo **12** (2010), no. 3, 139–151.

Copyright 2016 by the Tusi Mathematical Research Group.
Date: Received: Apr. 23, 2017; Accepted: Sep. 11, 2017.
*Corresponding author.
2010 *Mathematics Subject Classification.* Primary 47H10; Secondary 47H08, 34G25, 34A60.
Key words and phrases. Fixed point, measure of noncompactness, evolution inclusion.

7. K. J. Engel and R. Nagel, *One-parameter semigroups for linear evolution equations*, With contributions by S. Brendle, M. Campiti, T. Hahn, G. Metafune, G. Nickel, D. Pallara, C. Perazzoli, A. Rhandi, S. Romanelli and R. Schnaubelt, Graduate Texts in Mathematics, 194, Springer-Verlag, New York, 2000.
8. K. Fan, *Fixed-point and minimax theorems in locally convex topological linear spaces*, Proc. Nat. Acad. Sei. U.S.A. **38** (1952), 121–126.
9. L. Górniewicz, *Topological fixed point theory of multivalued mappings*, Mathematics and its Applications 495, Kluwer Academic Publishers Dordrecht, 1999.
10. M. Kamenskii, V. Obukhovskii, and P. Zecca, *Condensing multivalued maps and semilinear differential inclusions in Banach spaces*, Walter de Gruyter, Berlin-New York, 2001.
11. M. Kisielewicz, *Differential inclusions and optimal control*, Kluwer Dordrecht The Netherlands, 1991.
12. A. Meir and E. Keeler, *A theorem on contraction mappings*, J. Math. Anal. Appl. **28** (1969), 326–329.
13. A. Pazy, *Semigroups of linear operators and applications to partial differential equations*, Springer-Verlag New York, 1983.
14. A. Samadia and M. B. Ghaemia, *An extension of Darbo fixed point theorem and its applications to coupled fixed point and integral equations*, Filomat **28** (2014), no. 4, 879–886.
15. H. Thiems, *Integrated semigroup and integral solutions to abstract Cauchy problem*, J. Math. Anal. Appl. **152** (1990), 416–447.

[1]Mathematical Faculty, University of Science and Technology Houari Boumedine, Bab-Ezzouar, 16111, Algiers, Algeria.
E-mail address: bzr.nour@gmail.com

[2]Department of Mathematical Engineering, Yildiz Technical University, Davutpasa Campus, Esenler, 34220 Istanbul,Turkey.
E-mail address: vkkaya@yahoo.com