

## AN EXTENSION TO MULTIFUNCTIONS OF THE KEELER-MEIR'S FIXED POINT THEOREM

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**Abstract.** In this paper we prove the existence of fixed points for multifunctions verifying the property of weakly uniformly strict  $p$ -contraction. Then, as a corollary, we deduce a result on the existence of contractive fixed points for single-valued functions not necessarily with complete graph, which strictly contains a result due to Keeler and Meir.

**Key Words and Phrases:** orbit, iterate function, function with complete graph, contractive fixed point, multifunction, weakly uniformly strict  $p$ -contraction.

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### REFERENCES

- [1] S. Banach, *Sur les opérations dans les ensembles abstraits et leur application aux équations intégrales*, Fund. Math. **3**(1922), 133-181.
- [2] D.W. Boyd, J.S.W. Wong, *On nonlinear contractions*, Proc. Amer. Math. Soc. **20**(1969), 458-464.
- [3] V.W. Bryant, *A remark on a fixed point theorem for iterated mappings*, Amer. Math. Month. **75**(1968), 399-400.
- [4] S.C. Chu, J.B. Diaz, *Remarks on a generalization of Banach's principle of contraction mappings*, J. Math. Anal. Appl. **2**(1965), 440-446.
- [5] E. Keeler, A. Meir, *A theorem on contraction mappings*, J. Math. Anal. Appl. **28**(1969), 326-329.

- [6] S. Leader, *Equivalent Cauchy sequences and contractive fixed points in metric spaces*, Studia Math. **66**(1983), 63-67.
- [7] T.C. Lim, *On characterizations of Meir-Keeler contractive maps*, Nonlinear Anal. **46**(2001), 113-120.
- [8] G. Petruşel, *Data dependence of fixed points for Meir-Keeler type operators*, Fixed Point Theory **5**(2)(2004), 303-308.
- [9] W. Walter, *Remarks on a paper by F. Browder about contraction*, Nonlinear Anal. **5**(1)(1981), 21-25.

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