

## FIXED POINT THEOREMS FOR SPACES WITH A TRANSITIVE RELATION

KATARZYNA KUHLMANN AND FRANZ-VIKTOR KUHLMANN

Institute of Mathematics, University of Silesia at Katowice,  
Bankowa 14, 40-007 Katowice, Poland  
E-mail: fvk@math.us.edu.pl

Institute of Mathematics, Faculty of Mathematics and Physics,  
University of Szczecin, ul. Wielkopolska 15, 70-451 Szczecin, Poland  
E-mail: Katarzyna.Kuhlmann@usz.edu.pl

**Abstract.** We present general fixed point theorems for spaces that are equipped with a transitive relation. We apply them to prove corresponding theorems for ultrametric spaces, topological spaces, complete lattices, and ordered abelian groups and fields.

**Key Words and Phrases:** Fixed point theorem, fixed points on graphs, ultrametric spaces, topological spaces, complete lattices, ordered abelian groups and fields.

**2010 Mathematics Subject Classification:** 03E04, 54H25, 12J20, 47H10.

### REFERENCES

- [1] F.-V. Kuhlmann, K. Kuhlmann, *A common generalization of metric and ultrametric fixed point theorems*, *Forum Math.*, **27**(2015), 303–327.
- [2] F.-V. Kuhlmann, K. Kuhlmann, *Correction to A common generalization of metric and ultrametric fixed point theorems*, *Forum Math.*, **27**(2015), 329–330.
- [3] F.-V. Kuhlmann, K. Kuhlmann, *A basic framework for fixed point theorems: ball spaces and spherical completeness*, in preparation.
- [4] F.-V. Kuhlmann, K. Kuhlmann, S. Shelah, *Symmetrically complete ordered sets, abelian groups and fields*, *Israel J. Math.* **208** (2015), 261–290.

*Received: May 20, 2015; Accepted: July 2, 2015.*