

## NEW EXTENSION OF SOME COMMON FIXED POINT THEOREMS IN COMPLETE METRIC SPACES

MURCHANANEOG\*, PRADIP DEBNATH\*\*,<sup>1</sup> AND STOJAN RADENOVIĆ\*\*\*

\*Department of Mathematics  
North Eastern Regional Institute of Science and Technology  
Nirjuli, Arunachal Pradesh, 791109, India  
E-mail: murchananeog@gmail.com

\*\*Department of Applied Science and Humanities  
Assam University, Silchar, 788011, Assam, India  
E-mail: debnath.pradip@yahoo.com

\*\*\*University of Belgrade, Faculty of Mechanical Engineering  
Kraljice Marije 16, 11 120 Beograd, Serbia  
E-mail: radens@beotel.rs

**Abstract.** In the current paper, some common fixed point theorems are presented for generalized  $\varphi$ -weak contraction mappings and  $A_\varphi$ -contraction mappings. Also, we examine the existence and uniqueness of common fixed points for single-valued mappings satisfying the notion of weak compatibility in a complete metric space. Our results generalize and extend many results existing in literature.

**Key Words and Phrases:** Common fixed point, complete metric space, weakly compatible maps.  
**2010 Mathematics Subject Classification:** 47H10, 54H25, 54E50.

**Acknowledgment.** The authors express their heartfelt gratitude to the reviewers for their valuable comments and constructive suggestions towards improvement of the manuscript. The authors also thank the Editors-in-Chief for the editorial works.

### REFERENCES

- [1] R.P. Agarwal, D. O'Regan, *Fixed point theory for generalized contractions on spaces with two metrics*, J. Math. Anal. Appl., **248**(2000), no. 2, 402-414.
- [2] M. Akram, A.A. Zafar, A.A. Siddiqui, *A general class of contractions: A-contractions*, Novi Sad J. Math., **38**(2008), 25-33.
- [3] Y.I. Alber, S. Guerre-Delabriere, *Principles of weakly contractive maps in Hilbert spaces, New results in Operator Theory*, Advances and Appl., **98**(1997), 7-22.
- [4] N.A. Assad, W.A. Kirk, *Fixed point theorems for set-valued mappings of contractive type*, Pacific J. Math., **43**(3)(1972), 553-561.
- [5] D.W. Boyd, J.S. Wong, *On nonlinear contractions*, Proc. Amer. Math. Soc., **20**(1969), 458-464.
- [6] S.K. Chatterjea, *Fixed point theorems*, C.R. Acad. Bulgare Sci., **25**(1972), no. 6, 727-730.

---

<sup>1</sup>Corresponding author.

- [7] D. Đorić, *Common fixed point for generalized  $(\phi, \psi)$ -weak contractions*, Appl. Math. Lett., **22**(12)(2009), 1806-1900.
- [8] J. Jachymski, *Equivalent conditions for generalized contractions on (ordered) metric spaces*, Nonlinear Anal., **74**(3) (2011), 768-774.
- [9] G. Jungck, B.E. Rhoades, *Fixed point for set valued functions without continuity*, Indian J. Pure Appl. Math., **29**(1998), no. 3, 227-238.
- [10] Z. Kadelburg, M. Pavlović, S. Radenović, *Common fixed point theorems for ordered contractions and quasicontractions in ordered cone metric spaces*, Comput. Math. Appl., **59**(9)(2010), 3148-3159.
- [11] R. Kannan, *Some results on fixed points*, Bull. Calc. Math. Soc., **60**(1968), no. 1, 71-77.
- [12] V. Lakshmikantham and L. Čirić, *Coupled fixed point theorems for nonlinear contractions in partially ordered metric spaces*, Nonlinear Anal. TMA, **70**(2009), no. 12, 4341-4349.
- [13] S.B. Nadler, *Multi-valued contraction mappings*, Pacific J. Math., **30**(2)(1969), 475-488.
- [14] J.J. Nieto, R.L. Pouso, R. Rodríguez-López, *Fixed point theorems in ordered abstract spaces*, Proc. Amer. Math. Soc., **135**(2007), 2505-2517.
- [15] J.J. Nieto, R. Rodríguez-López, *Contractive mapping theorems in partially ordered sets and applications to ordinary differential equations*, Order, **22**(2005), no. 3, 223-239.
- [16] J.J. Nieto, R. Rodríguez-López, *Existence and uniqueness of fixed point in partially ordered sets and applications to ordinary differential equations*, Act. Math. Sin., English Series, **23**(2007), no. 12, 2205-2212.
- [17] V. Parvaneh, *Some common fixed point theorems in complete metric spaces*, Int. J. Pure Appl. Math., **76**(2012), no. 1, 1-8.
- [18] A. Petrușel, I.A. Rus, *Fixed point theorems in ordered  $L$ -spaces*, Proc. Amer. Math. Soc., **134**(2006), 411-418.
- [19] P. Popescu, *Fixed points for  $(\phi, \psi)$ -weak contractions*, Appl. Math. Lett., **24**(1)(2011), 1-4.
- [20] S. Radenović, Z. Kadelburg, *Generalized weak contractions in partially ordered metric spaces*, Comput. Math. Appl., **60**(2010), 1776-1783.
- [21] S. Radenović, Z. Kadelburg, D. Jandrlić, A. Jandrlić, *Some results on weakly contractive maps*, Bull. Iranian Math. Soc., **38**(3)(2012), 625-645.
- [22] A.C.M. Ran, M.C.B. Reurings, *A fixed point theorem in partially ordered sets and some applications to matrix equations*, Proc. Amer. Math. Soc., **132**(2004), no. 5, 1435-1443.
- [23] B.E. Rhoades, *Some theorems on weakly contractive maps*, Nonlinear Anal., **47**(2001), 2683-2693.
- [24] I.A. Rus, A. Petrușel, G. Petrușel, *Fixed Point Theory*, Cluj Univ. Press, 2008.
- [25] N. Shahzad, A.F.R.L. Hierro, F. Khojasteh, *Some fixed point theorems under  $(A, S)$ -contractivity conditions*, RACSAM, **111** (2017), no. 2, 307-324.
- [26] W. Sintunavarat, A. Petrușel, P. Kumam, *Common coupled fixed point theorems for  $w^*$ -compatible mappings without mixed monotone property*, Rendiconti del Circolo Matematico di Palermo, **61**(2012), no. 3, 361-383.
- [27] W. Sintunavarat, S. Radenović, Z. Golubović, P. Kumam, *Coupled fixed point theorems for  $F$ -invariant set*, Appl. Math. Inf. Sci., **7**(2013), no. 1, 247-255.
- [28] T. Van An, N. Van Dung, Z. Kadelburg, S. Radenović, *Various generalizations of metric spaces and fixed point theorems*, RACSAM, **109**(2015), no. 1, 175-198.
- [29] Z. Wu, C. Zhu, C. Yuan, *Fixed point results for cyclic contractions in Menger PM-spaces and generalized Menger PM-spaces*, RACSAM doi:10.1007/s13398-017-0393-8 (2017).
- [30] Q. Zhang, Y. Song, *Fixed point theory for generalized  $\phi$ -weak contractions*, Appl. Math. Lett., **22**(2009), 75-78.

Received: June 13, 2017; Accepted: June 14, 2018.