Dedicated to Professor Yeol Je Cho on the occasion of his retirement

Global Minimization of best proximity points for semi-cyclic Berinde contractions

PANITARN SARNMETA¹ and SUTHEP SUANTAI²

ABSTRACT.

In this paper, we introduce a semi-cyclic Berinde contraction pair on a metric space which is more general than that of semi-cyclic contraction pair defined by Gabeleh and Abkar [Gabeleh, M. and Abkar, A., Best proximity points for semi-cyclic contractive pairs in Banach spaces, Int. Math. Forum, 6 (2011), 2179–2186] and prove an existence result concerning global monomization of best proximity points of this pair. Our main result can be used to obtain a common fixed point theorem of some contractive mappings related to Berinde's contractions without commutative assumption. An example supporting our main result is also given.

Acknowledgement. This reserach was supported by Chiang Mai University.

REFERENCES

- [1] Abkar, A. and Gabeleh, M., Best proximity points for asymptotic cyclic contraction mappings, Nonlinear Anal., 74 (2011), 7261–7268
- [2] Abbas, M. and Jungck, G., Common fixed point results for noncommuting mappings without continuity in cone metric spaces, J. Math. Anal. Appl., 341 (2008), 416-420
- [3] Banach, S., Sur les oprations dans les ensembles abstraits et leur application aux quations intgrales, Fund. Math., 3 (1922), 133–181
- [4] Basha, S. S. and Shahzad, N., Common best proximity point theorems: Global minimization of some real-valued multi-objective functions, J. Fixed Point Theory Appl., 18 (2011), 587–600
- [5] Berinde, V., Approximating fixed points of weak φ -contractions using the Picard iteration, Fixed Point Theory, 4 (2003), 131–142
- [6] Berinde, V., Common fixed points of noncommuting discontinuous weakly contractive mappings in cone metric spaces, Taiwanese J. Math., 14 (2010), 1763–1776
- [7] Cho et al., Tripled best proximity point theorem in metric spaces, Math. Inequal. Appl., 16 (2013), 1197-1216
- [8] Derafshpour, M., Rezapour, Sh. and Shahzad, N., Best Proximity Points of cyclic-contractions in ordered metric spaces, Topol. Methods Nonlinear Anal., 37 (2011), 193–202
- [9] Eldred, A., A. and Veeramani, P., Existence and convergence of best proximity points, J. Math. Anal. Appl., 323 (2006), 1001–1006
- [10] Felicit, J. M. and Eldred, A. A., Best proximity points for cyclical contractive mappings, Appl. Gen. Topol., 16 (2015), 119–126
- [11] Gabeleh, M. and Abkar, A., Best proximity points for semi-cyclic contractive pairs in Banach spaces, Int. Math. Forum, 6 (2011), 2179–2186
- [12] He et al., Common fixed points for weak commutative mappings on a multiplicative metric space, Fixed Point Theory Appl., 2014 (2014):48
- [13] Jungck, G., Commuting maps and fixed points, Amer. Math. Monthly, 83 (1976), 261–263
- [14] Jungck, G., Common fixed points for commuting and compatible maps on compacta, Proc. Amer. Math. Soc., 103 (1988), 977–983
- [15] Karapinar, E., Best proximity points of cyclic mappings, Appl. Math. Lett., 25 (2012), 1761-1766

Received: 20.09.2017; In revised form: 17.01.2018; Accepted: 15.07.2018

2010 Mathematics Subject Classification. 41A65, 41A52.

 $Key \ words \ and \ phrases. \ \textit{best proximity point, semi-cyclic contraction}, \textit{berinde semi-cyclic contraction}.$

Corresponding author: Panitarn Sarnmeta; panitarn_s@cmu.ac.th

- [16] Kirk, W. A., Srinivasan, P. S. and Veeramani, P., Fixed points for mapping cycli contractions, Fixed Point Theory, 4 (2003), 79–89
- [17] Mongkolkeha, C., Cho, Y. J. and Kumam, P., Best proximity points for generalized proximal C-contraction mappingsin metric spaces with partial orders, J. Inequal. Appl., 2013 (2013):94
- [18] Mongkolkeha, C., Cho, Y. J. and Kumam, P., Best proximity points for Geraghtys proximal contraction mappingmappings, Fixed Point Theory Appl., 2013, (2013):180
- [19] Rezapour, Sh., Derafshpour, M. and Shahzad, N., Best proximty points of cyclic φ-contractions on reflexive Banach spaces, Fixed Point Theory Appl., **2010** (2010), Art. ID 946178

¹ Ph.D. DEGREE PROGRAM IN MATHEMATICS FACULTY OF SCIENCE
CHIANG MAI UNIVERSITY
CHIANG MAI 50200 THAILAND
E-mail address: panitarn_s@cmu.ac.th

² DEPARTMENT OF MATHEMATICS
CENTER OF EXELLENCE IN MATHEMATICS AND APPLIED MATHEMATICS
FACULTY OF SCIENCE
CHIANG MAI UNIVERSITY
CHIANG MAI 50200 THAILAND
E-mail address: suthep.s@cmu.ac.th