

FIXED POINT THEOREMS VIA CONE-NORMS AND CONE-VALUED MEASURES OF NONCOMPACTNESS

NGUYEN BICH HUY*, NGUYEN HUU KHANH** AND VO VIET TRI***

*Department of Mathematics, Ho Chi Minh City University of Pedagogy
280 An Duong Vuong, Ho Chi Minh City, Viet Nam
E-mail: huynb@hcmup.edu.vn; nguyenbichhuy@hcm.vnn.vn

**College of Science, Department of Mathematics, Can Tho University
3/2 street, Cantho Province, Viet Nam
E-mail: nhkhanh@ctu.edu.vn

***Department of Natural Science, Thu Dau Mot University
6 Tran Van On, Binh Duong province, Viet Nam
E-mail: trivv@tdmu.edu.vn

Abstract. In this paper, we obtain an extension of the Krasnoselskii fixed point theorem for sum of two operators to the case of cone normed spaces. We also prove a variant of the Darbo-Sadovskii theorem on fixed points for operators condensing with respect to a cone-valued measure of noncompactness and apply it to the Cauchy problem with deviating argument.

Key Words and Phrases: Fixed point, cone normed space, cone-valued measure of noncompactness, equation with deviating argument.

2010 Mathematics Subject Classification: 47H07, 47H08, 47H10.

REFERENCES

- [1] R.P. Agarwal, *Contraction and approximate contraction with an application to multi-point boundary value problems*, J. Comput. Appl. Math., **9**(1983), 315-325.
- [2] R.P. Agarwal, M.A. Khamsi, *Existence of Caristi's fixed point theorem to vector valued metric spaces*, Nonlinear Anal., **74**(2011), 141-145.
- [3] T. Abdejawad, Sh. Rezapour, *Some fixed point results in TVS-cone metric spaces*, Fixed Point Theory, **14**(2013), no. 2, 265-268.
- [4] R.R. Akhmerov, M.I. Kamenskii, A.S. Potapov, A.E. Rotkina, B.N.Sadovskii, *Measures of Noncompactness and Condensing Operators*, Birkhauser, 1992.
- [5] S. Carl, S. Heikkilä, *Fixed Point Theory in Ordered Sets and Applications*, Springer, New-York, 2011.
- [6] S. Jankovic, Z. Kadelburg, S. Radenovic, *On cone metric spaces: a survey*, Nonlinear Anal., **74**(2011), 2591-2601.
- [7] L.G. Huang, X. Zhang, *Cone metric spaces and fixed point theorems for contractive mappings*, J. Math. Anal. Appl., **332**(2)(2007), 1468-1476.
- [8] N.B. Huy, *Positive weak solution for some semilinear elliptic equations*, Nonlinear Anal., **48**(2002), 939-945.
- [9] L.V. Kantorovich, *The majorant principle and Newton's method*, Dokl. Acad. Nauk SSSR, **76**(1951), 17-20.

- [10] L.V. Kantorovich, *On some further applications of the Newton approximation method*, Vestn. Leningr. Univ. Ser. Math. Mech. Astron., **12**(7)(1957), 68-103.
- [11] M. Krein, *Propriétés fondamentales des ensembles coniques normaux dans l'espace de Banach*, Dokl. Acad. Sci. URSS, **28**(1940), 13-17.
- [12] I.R. Petre, *Fixed points for φ -contractions in E -Banach spaces*, Fixed Point Theory, **13**(2012), no. 2, 623-640.
- [13] P.P. Zabreiko, *K -metric and K -normed spaces: survey*, Collect. Math., **48**(4-6)(1997), 825-859.

Received: November 21, 2013; Accepted: January 10, 2014.

