EXISTENCE AND UNIQUENESS OF POSITIVE SOLUTIONS FOR EVEN ORDER SINGULAR IMPULSIVE BOUNDARY VALUE PROBLEM

Yu Tian [1,2], Johnny Henderson [2,*], Xueyan Liu [2], Shawn Sutherland [2]

[1]School of Science, Beijing University of Posts and Telecommunications
Beijing 100876, P.R. China

[2]Department of Mathematics, Baylor University
Waco, Texas, 76798-7328, USA

*Corresponding author email: johnny_henderson@baylor.edu

Abstract. By using fixed point theory for monotone operators, we prove the uniqueness of a positive solution for an even order singular impulsive boundary value problem.

Keywords. Even order singular differential equation, impulsive, uniqueness, positive solution.

AMS (MOS) subject classification: 34B18, 34B10, 34B16.

References

[1] A. Cabada, E. Liz, Boundary value problems for higher order ordinary differential equations with impulses, *Nonlinear Anal.*, **32**, (1998) 775-786.

[2] J. Caballero, J. Harjani, K. Sadarangani, Uniqueness of positive solutions for a class of fourth-order boundary value problems, *Abstr. Appl. Anal.*, 2011, Art. ID 543035, 13 pp.

[3] P. Eloe and M. Sokol, Positive solutions and conjugate points for a boundary value problem with impulse, *Dynam. Systems Appl.*, **7**, (1998) 441-450.

[4] C. Y. Huang, Fixed point theorems for a class of positive mixed monotone operators, *Math. Nachr.*, **285**, (2012) 659-669.

[5] E. K. Lee, Y. H. Lee, Multiple positive solutions of singular two point boundary value problems for second order impulsive differential equation, *Appl. Math. Comput.*, **158**, (2004) 745-759.

[6] X. Lin, D. Jiang, Multiple positive solutions of Dirichlet boundary value problems for second order impulsive differential equations, *J. Math. Anal. Appl.*, **321**, (2006) 501-514.

[7] X. Liu, D. Guo, Periodic Boundary value problems for a class of second-order impulsive integro- differential equations in Banach spaces, *J. Math. Anal. Appl.*, **216**, (1997) 284-302.

[8] E. Liz, Boundary value problems for first order impulsive integro-differential equations of Volterra type, *Dynam. Systems Appl.*, **7**, (1998) 481-494.

[9] Y. Tian, D. Jiang, W. Ge, Multiple positive solutions of periodic boundary value problems for second order impulsive differential equations, *Appl. Math. Comput.*, **200**, (2008) 123-132.

[10] Z. Yang, Existence and uniqueness of positive solutions for a higher order boundary value problem, *Comput. Math. Appl.*, **54**, (2007) 220-228.

[11] C. Yuan, X. Wen, D. Jiang, Existence and uniqueness of positive solution for nonlinear singular 2m-th continuous and discrete Lidstone boundary value problems, *Acta Math. Sci. Ser. B Engl. Ed.*, **31**, (2011) 281-291.