

ON A D.V. IONESCU PROBLEM FOR FUNCTIONAL-DIFFERENTIAL EQUATIONS

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Abstract. The purpose of this paper is to study a generalization of a D.V. Ionescu's problem. Existence, uniqueness and data dependence (monotony, continuity, differentiability with respect to parameter) results of solution for the Cauchy problem are obtained using weakly Picard operator theory.

Key Words and Phrases: Picard operator, weakly Picard operators, polylocal problem, fixed points, data dependence.

2000 Mathematics Subject Classification: 47H10, 47N20, 34K07.

REFERENCES

- [1] O. Arama, *Contributions to the study of polylocal problems relative to differential equations*, Ph.D. Thesis (in Romanian), Cluj, 1965.
- [2] D.V. Ionescu, *Quelques théorems d'existence des intégrales des systèmes d'équations différentielles*, C.R. de l'Acad. Sci. Paris, **186**(1929), 1262-1263.
- [3] Ph. Hartman, A. Wintner, *On an oscillation criterion of de la Vallée Poussin*, Quaterly of Applied Mathematics, **13**(1955), no. 3, 330-332.
- [4] V. Mureşan, *Differential equation with linear modification of arguments*, Transilvania Press, Cluj-Napoca, 1997.
- [5] A.I. Perov, A.V. Kibenko, *On a general method to study boundary value problems*, Iz. Akad. Nauk., **30**(1966), 249-264.

- [6] A. Petruşel, I.A. Rus, *Fixed point theorems in L -spaces*, Proc. Amer. Math. Soc., **134**(2006), 411-418.
- [7] A. Petruşel, I.A. Rus, *Mathematical contributions of Professor D.V. Ionescu*, Notices from the ISMS, January, 2008, 1-11.
- [8] T. Popoviciu, *Sur quelques propriétés des fonctions d'une ou deux variables réelles*, Mathematica (Cluj), **8**(1934), 1-86.
- [9] D. Ripianu, *On Vallée Poussin inequality in the case of second order differential equations* (in Romanian), St. Cerc. Mat. (Cluj), **8**(1963), 123-150.
- [10] I.A. Rus, *Picard operators and applications*, Scientiae Mathematicae Japonicae, **58** (2003), no.1, 191-219.
- [11] I.A. Rus, *Functional differential equations of mixed type, via weakly Picard operators*, Sem. on Fixed Point Theory Cluj-Napoca, **3**(2002), 335-346.
- [12] I.A. Rus, *Generalized Contractions and Applications*, Cluj University Press, Cluj-Napoca, 2001.
- [13] I.A. Rus, *Weakly Picard operators and applications*, Sem. on Fixed Point Theory, Cluj-Napoca, **2**(2001), 41-58.
- [14] I.A. Rus, A. Petruşel, M. Şerban, *Weakly Picard operators: equivalent definitions, applications and open problems*, Fixed Point Theory, **7**(2006), no. 1, 3-22.
- [15] Ch.J. de la Vallée Poussin, *Sur l'équation différentielle du second ordre. Détermination d'une intégrale par deux valeurs assignée. Extension aux équations d'ordre n* , J. Math. Pures Appl., **8**(1929), 125-144.

Received: June 5, 2008; Accepted: October 10, 2008.