Ann. Acad. Rom. Sci.
Ser. Math. Appl.
ISSN 2066-6594 Vol. 10, No. 2/2018

EXISTENCE AND CONTROLLABILITY OF FRACTIONAL NEUTRAL INTEGRO-DIFFERENTIAL SYSTEMS WITH STATE-DEPENDENT DELAY*

Palaniyappan Kalamani†, Dumitru Baleanu‡, Selvaraj Suganya§ and Mani Mallika Arjunan¶

Abstract

In light of ideas for semigroups, fractional calculus and Banach contraction principle, this manuscript is mainly concerned with existence and controllability of fractional neutral integro-differential structures with state-dependent delay in Banach spaces. To obtain our results, our working hypotheses are that the functions determining the equation satisfy certain Lipschitz conditions of local type which is similar to the hypotheses [5]. Examples are presented to demonstrate the application of the results established.

MSC: 34K05, 26A33, 34A12, 35R12, 45J05

keywords: Fractional order differential equations, Banach fixed point theorem, state-dependent delay, semigroup theory.

*accepted for publication in revised form on June 20, 2018

†kalamn17@gmail.com Department of Mathematics, C. B. M. College, Kovaipudur, Coimbatore - 641 042, Tamil Nadu, India

‡dumitru@cankaya.edu.tr Department of Mathematics and Computer Sciences, Faculty of Arts and Sciences, Cankaya University, 06530 Ankara, Turkey and Institute of Space Sciences, Magurele-Bucharest, Romania

§selvarajsuganya2014@yahoo.in Department of Mathematics, C. B. M. College, Kovaipudur, Coimbatore - 641 042, Tamil Nadu, India

¶arjunphd07@yahoo.co.in Department of Mathematics, C. B. M. College, Kovaipudur, Coimbatore - 641 042, Tamil Nadu, India