On the New Concepts of Solutions and Existence Results for Impulsive Integro-Differential Equations with a Deviating Argument

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Abstract: In this paper, we prove the existence of $\mathcal{PC}$-mild solutions for impulsive integro-differential equations with a deviating argument in a Banach space H. The results are obtained by using the analytic semigroup theory and the fixed point methods.

Keywords: *impulsive integro-differential equation; deviating argument; analytic semigroup; fixed point theorems.*

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1 Introduction

In the theory of differential equations with deviating arguments, we study the differential equations involving variables (arguments) as well as unknown functions and its derivative, generally speaking, under different values of the variables (arguments). It is a very important and significant branch of nonlinear analysis with numerous applications to physics, mechanics, control theory, biology, ecology, economics, theory of nuclear reactors, engineering, natural sciences, and many other areas of science and technology. The book [3] by El'sgol'ts and Norkin provides a comprehensive study of differential equations with deviated arguments. The existence, uniqueness, almost automorphic solutions and asymptotic behaviors of differential equations with deviating arguments have been studied by many authors like Driver [4], Obreg [5], Grimm [6], Gal [7], Haloi [8, 10, 11] (see [12–16] and references cited therein).

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