

## FIRST ORDER NONLINEAR IMPLICIT IMPULSIVE INTEGRO-DIFFERENTIAL EQUATIONS IN BANACH SPACES<sup>1</sup>

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**Abstract.** In this paper, by using Banach's fixed point theorem, we obtain some new existence theorems of solutions for a class of initial value problems of nonlinear first order implicit impulsive integro-differential equations in Banach spaces.

**Keywords.** Nonlinear implicit impulsive integro-differential equation, initial value problem, fixed point, solution.

**AMS (MOS) subject classification:** 34G20, 45J05

### 1 Introduction

The differential equations and implicit differential equations in Banach spaces with applications have been studied by many authors (see, for example, [1-6, 10, 13]). On the other hand, the theory of impulsive differential equations in the field of modern applied mathematics has made considerable headway, because all the structure of its emergence had deep physical background and realistic mathematical model (see [12]). Some related works, we refer to [7-9, 14, 15] and the references therein.

In 1995, Liu and Guo [14] introduced and studied a class of first order impulsive integro-differential equations and obtained some new existence theorems of solutions for the initial value problem of first order impulsive integro-differential equations in Banach spaces. Very recently, Huang and Lan [11] proved some new existence theorems of solutions for a class of first order implicit differential equations in Banach spaces by means of the directional Lipschitzian condition and Krasnoselskii's fixed point theorem. Now, in this paper, we consider the following initial value problem for first order nonlinear implicit impulsive integro-differential equation in Banach space:

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