



Existence Results for a Fractional Integro-Differential Equation with Nonlocal Boundary Conditions and Fractional Impulsive Conditions

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Abstract: In this paper, we have established the existence and uniqueness of solution for a class of impulsive fractional integro-differential equations with nonlocal boundary conditions. The existence results are proved by applying the theory of fractional calculus and fixed point theorems. At last an application is given to verify our results.

Keywords: *fractional derivatives and integrals; differential equations with impulses; boundary value problems with impulses; equations with impulses; nonlocal and multi-point boundary value problems.*

Mathematics Subject Classification (2010): 26A33, 34A37, 34B37, 34K45, 34B10.

1 Introduction

Fractional differential equations are the corner stone for description of memory and hereditary properties of many materials and processes. Its useful applications include mathematical modeling in many engineering and science disciplines like physics, chemistry, biophysics, biology etc. Its non local behavior is the vital characteristic that makes it vary from its rival in classical calculus. For more details one can see the papers [1, 6, 8, 10, 13, 15, 22, 24, 25] and the references therein.

Integro-differential equations occur in probability theory, nonlinear viscoelastic bodies, acoustic scattering theory and bio-logical population models and systems with substantially distributed parameters. All these problems end up with boundary value problems of integro-differential equations. For details see the paper [21].

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