

Existence and Uniqueness of Mild Solutions for Fractional Integrodifferential Equations with Nonlocal Conditions in Banach Spaces

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Abstract

The aim of this paper is to prove the existence of uniqueness of mild solutions of a class of nonlocal fractional nonlinear integrodifferential equations

$$\begin{cases} \frac{d^q u(t)}{dt^q} + Au(t) = \int_0^t f(t, s, x(s)) ds + \int_0^t a(t-s)g(s, y(s)) ds, & t \in [0, T], \\ u(0) + h(x) = u_0. \end{cases}$$

in a Banach space X , where $0 < q < 1$. Results are obtained by fixed point theorem. The results are established by using Krasnoselskii's fixed point theorem and the contraction mapping principle.

Mathematics Subject Classification: 34K05, 34A12, 34A40

Keywords: Integrodifferential equation, fractional equation, mild solution, compact semi group, Krasnoselskii theorem; Semi group of linear operators

1. Introduction

Byszewski [3] proved the existence and uniqueness of mild, strong and classical solutions of the following Cauchy problems: