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LOCAL AND NONLOCAL PROBLEMS FOR FRACTIONAL IMPULSIVE EVOLUTION SYSTEMS WITH ORDER $\nu \in (1, 2)$

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ABSTRACT. In this paper, we study the existence and uniqueness of *PC*-mild solutions for fractional impulsive evolution systems with Caputo derivative. First, we give a compact result of the solution operators of linear fractional evolution system while the cosine family is compact. Second, the representation of *PC*-mild solutions of linear fractional impulsive systems with initial value conditions and nonlocal initial value conditions are given by using the Laplace transform method. Third, several sufficient conditions for judging the existence and uniqueness of solutions of our problem are established via some fixed point theorems and operator semigroup theory. Finally, an example is given to illustrate the results of our paper.

1. Introduction

The application and research of fractional calculus in the science and engineering fields have shown a thriving trend in recent years. The fractional order viscoelastic theory provides a novel and accurate mathematical tool for studying the mechanical properties of new materials. The appearance of fractional

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