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EXISTENCE RESULTS FOR CLASS OF FRACTIONAL ORDER BOUNDARY VALUE PROBLEMS WITH INTEGRABLE IMPULSES

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Abstract. In this article, we study the existence and uniqueness results for fractional functional boundary value problems with integrable impulses. The Boyd and Wang, Schaefer's and Burton and Kirk fixed point theorems on a complex Banach space are applied to obtain the main out comes. Also, we present examples to verify the claimed results.
Keywords. Fractional order differential equation, periodic boundary value problems, contractions, Impulsive conditions, Existence, Uniqueness.

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1 Introduction

In recent era, fractional differential equations are used in almost every branch of science due to its nonlocal nature. There are immense number of papers related to differential equations of arbitrary order with initial and boundary conditions being published but still far less work has been done to develop the existence of solutions for fractional order differential equations with boundary conditions, see [1, 2, 3, 4] and the references therein.

Dynamical systems with evolutionary process are characterized by short or long term perturbations (impulse) of the state at any instant (see [5, 6, 7, 8] and references therein). At present, such processes have received great attention, due to wide range of applications such as medicine, mechanical, engineering, biology and ecology. In the theory of pharmacotherapy, it has observed that the long term perturbations are usually appear in the form of non-instantaneous impulses. Recently, Hernandez and O'Regan [9] initiated the study of these type of impulses to describe the hemodynamic equilibrium process in bloodstream of a person. Moreover, in the papers [9, 10, 11, 12, 13, 14, 15, 16, 17] authors examined the qualitative properties like existence, uniqueness, stability and periodicity of solution for the fractional differential equations with non-instantaneous impulses.

Further, Wang et al. [18] considered the following periodic boundary