

**PHILOS-TYPE OSCILLATION CRITERIA FOR FRACTIONAL
DIFFERENTIAL EQUATIONS WITH IMPULSIVE CONDITIONS**

Abdur Raheem, Asma Afreen and Areefa Khatoon

Department of Mathematics,
Aligarh Muslim University,
Aligarh - 202002, Uttar Pradesh, INDIA

E-mail : araheem.iitk3239@gmail.com, afreen.asma52@gmail.com,
areefakhatoon@gmail.com

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Abstract: The present article is concerned with the oscillatory nature of the fractional differential equation of order $\alpha \in (2, 3)$ with impulsive effects. By employing a generalized Riccati transformation, we derive several oscillation criteria of Philos type, which are either new or improve several recent results in the literature. Also, we show the stability of the considered problem. To obtain the results, we transform the fractional differential equation into a second-order ordinary differential equation. In addition, we provide examples to show the effectiveness of the results.

Keywords and Phrases: Fractional differential equations, Impulsive conditions, Oscillation, Differential inequality method.

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1. Introduction

The concept of fractional derivatives was originally established in Leibniz's letter to L'Hospital on September 30, 1695 [17], when he raised the meaning of derivative of order $\frac{1}{2}$. The issue raised by Leibniz attracted many well-known mathematicians, including Liouville, Grünwald, Riemann, Euler, Lagrange, Heaviside, Fourier, Abel, Letnikov, and many others. Since the 19th century, the theory of fractional calculus originated rapidly and was the foundation for several disciplines