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MONOTONE ITERATIVE TECHNIQUE FOR CAPUTO FRACTIONAL DIFFERENTIAL EQUATIONS WITH VARIABLE MOMENTS OF IMPULSE

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Abstract. In this paper we study monotone iterative technique for the solution of initial value problem of impulsive Caputo fractional differential equations of order q, $0 < q < 1$, with variable moments under the weakened hypothesis of C_p continuity.

Keywords. Impulsive Caputo fractional differential equations, existence, upper and lower solutions, monotone iterative technique.

AMS (MOS) subject classification: 34A08,34A37, 34K07, 34K45, 26A33.

1 Introduction

The theory of fractional calculus is as old as classical calculus. The origins of fractional calculus can be traced back to the end of the seventeenth century. In a letter correspondence with Gottfried Wilhelm Leibniz (1646-1716), Marquis de L'Hopital (1661-1704) asked "What if the order of the derivative is $\frac{1}{2}$"? In his reply, dated 30 September 1695, Leibniz wrote to L'Hopital as follows: "... This is an apparent paradox from which, one day, useful consequences will be drawn. ..."

We can find numerous applications in various fields like viscoelasticity, electromagnetic , electrical networks, control theory, electrical circuits, medicine, chemistry, aerodynamics, porous media, electrodynamics of complex medium, electrochemistry and fluid mechanics etc. The first application of fractional calculus was made by Abel(1802-1829) in the tautochronous problem. There has been a significant development in the theory of fractional calculus in recent years. The applications and major contributions in this field are given in [6, 14, 15, 16, 19, 20, 21, 26, 28, 30] and the references therein. The geometric and physical interpretation of fractional integration and