

GENERALIZED QUASILINEARIZATION FOR HYBRID CAPUTO FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract. In this paper we study the method of Generalized Quasilinearization for hybrid Caputo fractional differential equations which are Caputo fractional differential equations with fixed moments of impulse. In order to prove this result we use the weakened assumption of C^q -continuity in place of local Hölder continuity.

Keywords. Hybrid Caputo fractional differential equations, Generalized Quasilinearization, Existence.

AMS (MOS) subject classification: 34K07, 34A08.

1 Introduction

In the recent years, there has been a significant amount of work done in the theory of fractional differential equations and many researchers are delving into this area due to its immense potential in applications such as Fluid Flow, Rheology, Dynamical Processes in Self-Similar and Porous Structures, Diffusive Transport Akin to Diffusion, Electrical Networks, Probability and Statistics, Control Theory of Dynamical Systems, Viscoelasticity, Electrochemistry of Corrosion, Chemical Physics, Optics and Signal Processing, and so on. The works of Kilbas et al[2], Podlubny[1], Lakshmikantham et al[3] and then references [4-9] bear testimony to the continued interest in this area.

Another field which has a lot of scope is the theory of hybrid systems or impulsive differential systems[10]. This is due to the fact that many evolution processes are characterized by the fact that they experience a change of state abruptly, that is, in a very short duration of time. This abrupt change can be considered as short term perturbations whose duration is negligible. Thus we assume that these perturbations act instantaneously in the form of impulses. Thus it is obvious that hybrid systems form a better model to