

**APPROXIMATING LOCAL SOLUTION OF AN INITIAL VALUE
PROBLEM OF NONLINEAR FIRST ORDER ORDINARY HYBRID
DIFFERENTIAL EQUATIONS WITH MAXIMA**

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Abstract: In this paper, we prove a couple of approximation results for local existence and uniqueness of the solution of an initial value problem of nonlinear first order ordinary hybrid differential equations with maxima under weaker partial compactness and partial Lipschitz type conditions using the Dhage monotone iteration method based on the recent hybrid fixed point theorems of Dhage. An approximation result for the Ulam-Hyers stability of the local solution of the considered hybrid differential equation with maxima is also established. Our main abstract results are also illustrated with a couple of numerical examples.

Keywords and Phrases: Initial value problem, Hybrid fixed point principle, Dhage monotone iteration method, Approximation result, Ulam-Hyers stability.

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1. Introduction

The class of differential equations with maxima is the special case of the class of functional differential equations with delay and calls for the present value of the unknown function depends upon the previous maximum value of the function involved in the differential equations. Such differential equations occur in the automatic control theory, signal processing and allied areas of mathematics. A variety