QUALITATIVE RESULTS FOR SOLUTIONS TO NONLINEAR CAPUTO DIFFERENTIAL EQUATIONS SATISFYING THE OSGOOD CONDITION

M. PALANI, C. C. TISDELL AND A. USACHEV

Abstract. We consider an initial value problem involving a single-term Caputo fractional differential equation. For those with right-hand sides that satisfy the Osgood condition, we establish novel uniqueness and comparison theorems.

In addition, we discuss a reduction of the fractional order problem to an integer ordered one. We identify inconsistencies in recent work by Demirci and Ozalp regarding this via the use of several counterexamples. Nevertheless, we take a constructive approach by proving that a priori estimates for the solution of a fractional order problem can be obtained from that for the corresponding integer order problem. All results are illustrated with examples.


Keywords and phrases: Caputo derivative, Osgood condition, existence of solution, comparison theorem.

REFERENCES
