Márquez Albés, Ignacio; Tojo, F. Adrián F.
Existence and uniqueness of solution for Stieltjes differential equations with several derivators. (English) [Zbl 07388021] 

Summary: In this paper, we study some existence and uniqueness results for systems of differential equations in which each of the equations of the system involves a different Stieltjes derivative. Specifically, we show that this problems can only have one solution under the Osgood condition, or even, the Montel-Tonelli condition. We also explore some results guaranteeing the existence of solution under these conditions. Along the way, we obtain some interesting properties for the Lebesgue-Stieltjes integral associated with a finite sum of nondecreasing and left-continuous maps, as well as a characterization of the pseudometric topologies defined by this type of maps.

MSC:
26A24 Differentiation (real functions of one variable): general theory, generalized derivatives, mean value theorems
34A12 Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions to ordinary differential equations
34A34 Nonlinear ordinary differential equations and systems
34A36 Discontinuous ordinary differential equations

Keywords:
Lebesgue-Stieltjes integral; Stieltjes derivative; uniqueness; existence

Full Text: DOI

References:
[14] López Pouso, R.; Márquez Albés, I.; Rodríguez-López, J., Solvability of non-semicontinuous systems of Stieltjes differential


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