

Numerical methods for discontinuous ODEs of Filippov's type

Luciano Lopez*

Workshop "Donato Trigiante: il matematico, l'uomo, le idee"

Abstract

Numerical methods for a system of ODEs the solution of which is directed towards a manifold S defined as the 0-set of a smooth function h ($S = \{x \in R^n : h(x) = 0\}$) are considered. This kind of systems are known in literature as Filippov's type systems the solutions of which may present different behaviours, for instance cross or slide the manifold S . It is assumed that the exact solution trajectory hits S non-tangentially, and numerical techniques guaranteeing that the trajectory approaches S from one side only (i.e., does not cross it) are studied. Standard methods and methods which arrive to S in a finite number of steps are considered. Particular emphasis will be given to the "event location techniques" which are a fundamental task in the construction of these procedures.

*Università di Bari