Relation Between Fuzzy Semigroups and Fuzzy Dynamical Systems

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Abstract: In this work we study a relation between fuzzy semigroups and fuzzy dynamical systems. Some concepts about stability are introduced to evaluate fuzzy semigroups. Several examples are given to illustrate the obtained results.

Keywords: *fuzzy strongly continuous semigroups; fuzzy dynamical systems; stability; Zadehs extension.*

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1 Introduction

Let $\pi(t,.)$ be a flow generated by solutions of autonomous differential equation. M. T. Mizukoshi et al. showed in [13] that the family of applications $\widehat{\pi}(t,.)$, indexed by $\mathbb{R}$, obtained by Zadeh's extension(see [17]) on initial condition of the flow $\pi(t,.)$, satisfies conditions that characterize $\widehat{\pi}(t,.)$ as a dynamical system in the metric space E^n. In [14], authors discuss conditions for existence of equilibrium points for $\widehat{\pi}(t,.)$ and the nature of the stability of such equilibrium points. New results about equilibrium points are presented in [2].

In [1], M. S. Cecconello discusses results obtained in [4] on invariant sets and stability of such fuzzy sets for fuzzy dynamical systems.

The fuzzy dynamical systems we consider here are obtained by Zadeh's extension of dynamical systems defined on subsets of $\mathbb{R}^n$.

In this paper we discuss relationships between fuzzy semigroups and fuzzy dynamical systems and consider results obtained in [1] on invariant sets and stability of such fuzzy sets, but in this case for fuzzy semigroups.

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