

Chaotic Semiflows with General Acting Topological Monoids

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Abstract : A semiflow is a triple consisting of a Hausdorff topological space X , a commutative topological monoid T and a continuous monoid action of T on X . The acting monoid T is usually either the discrete monoid \mathbb{N}_0 of nonnegative integers (in which case the semiflow can be defined as a pair (X, f) consisting of a phase space X and a continuous function $f: X \rightarrow X$), or the monoid \mathbb{R}_+ of nonnegative real numbers (the so-called one-parameter monoid). However, it turns out that there are real-life situations where it is useful to consider the acting monoids that are a combination of discrete and continuous monoids. That, for example, happens, when we are observing certain dynamical system at discrete moments, but after some time realize that it would be beneficial to continue our observations in real time. The acting monoid in that case would be $T = \{0, t_0, 2t_0, \dots, (n-1)t_0\} \cup [nt_0, \infty)$ with the operation and topology induced from real numbers. This partly explains the motivation for the level of generality which is pursued in our research. We introduce the PSP monoids, which include all but "pathological" monoids, and most of our statements hold for them. The topic of our presentation are some recent results about chaos-related properties in semiflows, indecomposability and sensitivity of semiflows in the described general context.

Keywords : chaos, indecomposability, PSP monoids, semiflow, sensitivity

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