

IMPULSIVE SEMILINEAR VECTOR FIELDS IN DIMENSION THREE

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In this presentation, we will discuss the behavior of the switching 3-order differential equation given by

$$x''' = a \cdot \operatorname{sgn}(x), \quad x \in \mathbb{R}, \quad a \in \mathbb{R}, \quad a \neq 0. \quad (1)$$

In order to obtain periodic orbits of any differentiability degree, we study the associated vector field, acting in three dimensional space, with impulse. This associated vector field has a special nilpotent form, that constitute a class of vector fields that is studied, for instance, in [JGS] and [JT1].

Firstly we study the associated vector field L and we find an invariant curve. After that, we use the impulsive mechanism, see [A2], to generate periodic orbits of the initial switching 3-order differential equation.

Referências

- [A2] AKHMET, M. *Principles of discontinuous dynamical systems*. New York: Springer-Verlag, 2010.
- [JGS] JACQUEMARD, A.; GARCIA, R. A.; SILVA, T. S. *Relay system n-dimensional*. Preprint.
- [JT1] JACQUEMARD, A.; TEIXEIRA, M. A. *Computer analysis of periodic orbits of discontinuous vector fields*. Journal of Symbolic Computation. 35(5): 617-636, 2003.
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