

On splitting concepts for dynamical systems in Banach spaces

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Abstract

The qualitative theory of the asymptotic behaviors of dynamical systems is a prolific research area, with an important development in the last years.

Different types of uniform (nonuniform) asymptotic properties are approached as: stability, dichotomy, trichotomy and splitting.

The exponential forward splitting was introduced by B. Aulbach, J. Kalkbrenner ([1]) and B. Aulbach, S. Siegmund ([2]) for noninvertible difference equations and the authors justify the study of this notion by the fact that there are differential equations whose backward solutions are not guaranteed to exist.

Also, in [5], the properties of exponential splitting, respectively strong exponential splitting are treated for linear discrete-time systems as generalization of exponential dichotomy, respectively strong exponential dichotomy.

In this talk we approach a concept of uniform (bi)splitting and two concepts of nonuniform (tri)splitting with growth rates for dynamical systems described through skew-evolution semiflows from the point of view of invariant, respectively strongly invariant projector families.

Keywords: splitting; dynamical systems; trichotomy

Domain: mathematics

Motivation: The property of splitting-type is a topical issue, studied in recent years from various perspectives.

Methodology of Research: The research is based on the problems studied by B. Aulbach, J. Kalkbrenner ([1]) and B. Aulbach, S. Siegmund ([2]).

Conclusions: We prove the equivalence between the uniform (bi)splitting in continuous case, respectively discrete case and we obtain some uniform and nonuniform characterizations for the nonuniform (tri)splitting through Lyapunov functions.

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