# Discrete asymptotic behaviors for skew-evolution semiflows on Banach spaces

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ABSTRACT.

The paper emphasizes asymptotic behaviors, as stability and instability for skew-evolution semiflows, defined by means of evolution semiflows and evolution cocycles and which can be considered generalizations for evolution operators and skew-product semiflows. The unified treatment for the characterization of the studied properties in the nonuniform case is given in discrete time.

The results, which are characterizations of Datko, Barbashin and Rolewicz type for stability and instability and were presented in [8] and [9], can be considered generalizations of those obtained for evolution operators and skew-product semiflows in Banach spaces, in continuous and discret time in [5] and [6]. Characterizations for the nonuniform stability for evolution processes were given in [1] and for difference equations in [2], as well as in [4] for evolution families. For evolution operators, characterizations for the nonuniform instability were obtained in [3] and [7].

## REFERENCES

[1] Buşe, C., *On nonuniform exponential stability of evolutionary processes*, Rend. Sem. Mat. Univ. Politec. Torino, **52** (1994), 395–406

[2] Megan, M. and Preda, P., *Conditions for exponential stability of difference equations in Banach spaces*, An. Univ. Timişoara Ser. Ştiinţ. Mat., **27** (1989), No. 1, 67–73

[3] Megan, M., Sasu, A. L. and Sasu, B., *Nonuniform exponential unstability of evolution operators in Banach spaces*, Glas. Mat., **36** (2001), No. 56, 287–295

[4] Megan, M., Sasu, A. L. and Sasu, B., *Asymptotic Behaviour of Evolution Families*, Ed. Mirton, Timişoara, 2003

[5] Megan, M., Stoica, C. and Buliga, L., *On asymptotic behaviors for linear skew-evolution semiflows in Banach spaces*, Carpathian J. Math., **23** (2007), 117–125

[6] Megan, M., Stoica, C., *Exponential instability of skew-evolution semiflows in Banach spaces*, Studia Univ. Babeş-Bolyai Math., **LIII** (2008), No. 1, 17–24

[7] Preda, C. and Preda, P., *Comportări asimptotice ale proceselor evolutive*, Ed. Mirton, Timişoara, 2007

[8] Stoica, C., *On exponential stability for skew-evolution semiflows on Banach spaces*, Preprint Univ. Bordeaux, arXiv: 0804.1479 (2008), 1–25

[9] Stoica, C., *L'instabilité des cocycles d'évolution fortement mesurable dans des espaces de Banach*, Preprint Univ. Bordeaux, arXiv: 0801.3401 (2008), 1–8

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