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On nonuniform exponential stability for skew-evolution semiflows in Banach spaces

CODRUŢA STOICA and MIHAIL MEGAN

ABSTRACT.

The paper considers some concepts of nonuniform asymptotic stability for skew-evolution semiflows in Banach spaces, which we have introduced in [Megan, M. and Stoica, C., *Exponential instability of skew-evolution semiflows in Banach spaces*, Stud. Univ. Babeş-Bolyai Math., **LIII** (2008), No. 1, 17–24] and for which we present equivalent definitions, as well as integral characterizations in a nonuniform setting. Some examples are included to illustrate the results and to clarify the differences between the uniform and nonuniform cases.

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REFERENCES

[1] Barbashin, E. A., *Introduction dans la theorie de la stabilité*, Izd. Nauka, Moscou, (1967)
[2] Barreira, L. and Valls, C., *Stability of Nonautonomous Differential Equations*, Lecture Notes in Math., 1926 (2008)
[3] Barreira, L. and Valls, C., *Existence of nonuniform exponential dichotomies and a Fredholm alternative*, Nonlinear Anal., **71** (2009), No. 11, 5220–5228
[4] Datko, R., *Uniform asymptotic stability of evolutionary processes in Banach spaces*., SIAM, J. Math. Anal., **3** (1972), 428–445
[5] Hai, P. Viet, *Continuous and discrete characterizations for the uniform exponential stability of linear skew-evolution semiflows*, Nonlinear Anal., **72** (2010), 4390–4396
[6] Megan, M., Sasu, A. L. and Sasu, B., *Exponential stability and exponential instability for linear skew-product flows*, Math. Bohem., **129** (2004), No. 3, 225–243
[7] Megan, M. and Stoica, C., *Exponential instability of skew-evolution semiflows in Banach spaces*, Stud. Univ. Babeş-Bolyai Math., **LIII** (2008), No. 1, 17–24
[8] Megan, M. and Stoica, C., *On uniform exponential trichotomy of evolution operators in Banach spaces*, Integral Equations Operators Theory, **60** (2008), No. 4, 499–506
[9] Megan, M. and Stoica, C., *Concepts of dichotomy for skew-evolution semiflows in Banach spaces*, Ann. Acad. Rom. Sci. Ser. Math. Appl., **2** (2010), No. 2, 125–140
[10] Rolewicz, S., *On uniform N-equistability*, J. Math. Anal. Appl., **115** (1986), 434–441
[11] Stoica, C. and Megan, M., *Nonuniform behaviors for skew-evolution semiflows in Banach spaces*, Operator Theory Live, Theta Ser. Adv. Math., (2010), 203–211
[12] Stoica, C. and Megan, M., *On uniform exponential stability for skew-evolution semiflows on Banach spaces*, Nonlinear Anal., **72** (2010), No. 3-4, 1305–1313

AUREL VLAICU UNIVERSITY OF ARAD
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
ELENA DRĂGOI STR. NO. 2, 310330, ARAD, ROMANIA
E-mail address: codruta.stoica@uav.ro

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Corresponding author: Codruţa Stoica; codruta.stoica@uav.ro

ACADEMY OF ROMANIAN SCIENTISTS
INDEPENDENŢEI SPL. NO. 54, 050094, BUCHAREST, ROMANIA
WEST UNIVERSITY OF TIMIŞOARA
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
VASILE PÂRVAN BD. NO. 4, 300223, TIMIŞOARA, ROMANIA
E-mail address: megan@math.uvt.ro