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Reviewer: Znojil, Miloslav

Reviewer number: 13388

Address:
UJF
250 68 Rez
Czech Republic
znojil@ujf.cas.cz

Author: This line will be completed by the MR staff.

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Review text:

Evolution equation on half line [with a linear and time-dependent operator which is, in general, unbounded] specifies evolution operators [which may be assumed exponentially bounded] and, in particular, their discrete-time forms A_n on a Banach space X. In the stability theory, the related homogeneous and non-homogeneous difference evolution equations exhibit many analogies to their continuous differential-equation predecessors.

Attention is paid to the existence of the bidirectional asymptotic exponential boundedness of solutions within a suitable domain (so called exponential dichotomy). In the continuous case (where the sufficient condition is that the stable space is complemented, etc), the problem has been already settled [also in a much broader geometric context of (semi-)linear parabolic equations]. Analogous results for the discrete case are provided in this paper.

They may be interpreted as a generalization of the finite-dimensional case where the necessary and sufficient condition of the existence of the exponential dichotomy is just the surjectivity of an auxiliary operator (related to the above-mentioned non-homogeneous version of our difference equation). By my opinion, the most interesting subtlety concerns the difference between the cases with the infinite and finite dimension of the kernel of the underlying projection operators.