

GENERALIZED EXPONENTIALLY STABLE LINEAR TIME-VARYING DISCRETE BEHAVIORS*

Ioan-Lucian Popa [†] Traian Ceașu [‡] Larisa Elena Biriș [§]
Tongxing Li [¶] Akbar Zada ^{||}

DOI <https://doi.org/10.56082/annalsarscimath.2020.1-2.256>

Dedicated to Dr. Vasile Drăgan on the occasion of his 70th anniversary

Abstract

This paper presents a new approach to formulating exponential behaviors like stability/instability for the linear time-varying systems and for the adjoint one. The classical concept of uniform exponential stability is generalized. Using this generalized concepts, some results extending existing uniform exponential stability conditions for linear time-varying systems are derived. As special cases for these results, some conditions are derived for the adjoint system. A characterization of the generalized concepts in terms of Lyapunov sequences is also given. Also, an example is included to further illustrate the connection with the classical concept of uniform exponential stability.

MSC: 93C55, 93D20

*Accepted for publication in revised form on May 9, 2020

[†]lucian.popa@uab.ro Department of Mathematics, "1 Decembrie 1918" University of Alba Iulia, 510009-Alba Iulia, Romania

[‡]Faculty of Mathematics and Computer Science, West University of Timișoara, 300223-Timișoara, Romania

[§]Faculty of Mathematics and Computer Science, West University of Timișoara, 300223-Timișoara, Romania

[¶]School of Control Science and Engineering, Shandong University, Jinan, Shandong 250061, P. R. China

^{||}Department of Mathematics, University of Peshawar, Peshawar 25000, Pakistan