The Infinite-Dimensional Continuous Time Kalman-Yakubovich-Popov Inequality

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Abstract

Infinite-dimensional continuous time passive scattering systems are introduced and related to generalized (possibly unbounded) solutions of the Kalman–Yakubovich–Popov inequality (KYP inequality). It is shown that for a minimal system node the KYP inequality has a generalized solution if and only if its transfer function conicides with a Schur class function in some right half-plane. The set of all solutions of the KYP inequality is shown to have a minimal and a maximal solution, which correspond to the available storage and the required supply.

Keywords

Passive, dissipative, available storage, required supply, optimal system, star-optimal system, bounded real lemma, quasi-similarity, Cayley transform.