

Coprime Factorizations and Well-Posed Linear Systems

Olof J. Staffans
Åbo Akademi University
Department of Mathematics
FIN-20500 Åbo, Finland
Olof.Staffans@abo.fi
<http://www.abo.fi/~staffans/>

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We study the basic notions related to the stabilization of an infinite-dimensional well-posed linear system in the sense of Salamon and Weiss. We first introduce an appropriate stabilizability and detectability notion, and show that if a system is jointly stabilizable and detectable then its transfer function has a doubly coprime factorization in H^∞ . The converse is also true: every function with a doubly coprime factorization in H^∞ is the transfer function of a jointly stabilizable and detectable well-posed linear system. We show further that a stabilizable and detectable system is stable if and only if its input/output map is stable. Finally, we construct a dynamic, possibly non-well-posed, stabilizing compensator. The notion of stability that we use is the natural one for the quadratic cost minimization problem, and it does not imply exponential stability.