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Exponentially stable uncertain systems in infinite dimension: converse Lyapunov characterization and some applications

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We discuss infinite-dimensional forward complete dynamical systems which are subject to uncertainties, representing switching parameters or external disturbances. We characterize the uniform (with respect to uncertainties) local, semi-global, and global exponential stability, in terms of coercive and non-coercive Lyapunov functionals. We illustrate the potential usefulness of the result discussing exponential stability of nonlinear retarded systems with uncertainties and exponential stability preservation under sampling for semilinear control switching systems.

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