A Convex Optimization Approach to Control of Infinite-Dimensional Systems

Emilia Fridman (Tel Aviv University)

Two main approaches are usually used for stability and control of infinite-dimensional systems: the analysis of the abstract infinite-dimensional system (e.g. in the Hilbert space) with the corresponding conclusions for specific systems or the direct approach to a specific system. In this talk both approaches to Lyapunov-based analysis will be presented. We will start with the Linear Operator Inequalities (LOIs) for the stability of linear time-delay systems in a Hilbert space. The decision variables of LOIs are operators in the Hilbert space. Being applied to a scalar heat equation and to a scalar wave equation, these conditions are reduced to standard finite-dimensional Linear Matrix Inequalities (LMIs). Then the direct approach for the sampled-data control of semilinear heat and to control/estimation of semilinear wave/beam PDEs will be discussed. As it happened with time-delay systems, an LMI approach is expected to provide effective tools for robust control of distributed parameter systems.

The talk will start with a very short presentation of the book
http://www.springer.com/birkhauser/mathematics/book/978-3-319-09392-5