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Robust stabilization of parabolic equations

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Robust stability is the property of a system to remain stable even in the presence of uncertainties or variations in its parameters, ensuring that the system operates reliably under different conditions. The achievement of such a behavior is done by a special technique used in control theory, called the H-infinity control problem, by which one designs robust stabilizing feedback controllers that ensure that a system corrupted by perturbations to reach stability with a prescribed performance. This method involves a transfer function that incorporates the effects of the input perturbations towards the output observation. The aim is to determine the optimal feedback controller that minimizes the effect of these perturbations on the output, by ensuring that the L^2-norm of the transfer function is smaller than the L^2-norm of the perturbation with a certain prescribed bound. We present a method of achieving a robust stabilization by the H-infinity control technique for infinite dimensional boundary control systems of parabolic type with distributed disturbances and discuss some applications.