Control of a system of parabolic equations with nonlinear coupling

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Abstract

We are interested in the internal control of a system of two semilinear parabolic equations. We assume that the control force is localized and applied in only one equation, and that the coupling between the two equations occurs through nonlinear terms only, so that the linearized system fails to be null controllable. Some reaction diffusion systems from chemistry and the Ginzburg-Landau equation are concerned. We establish the (local) null controllability of the system by combining the return method, the construction of special solutions to the heat equation, and standard Carleman estimates. This is a joint work with Jean-Michel Coron (Université Paris 6) and Sergio Guerrero (Université Paris 6).