BOUNDARY STABILIZATION OF THE DAMPED WAVE EQUATION WITH CAUCHY-VENTCEL DYNAMIC BOUNDARY CONDITIONS

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This work is devoted to the study of optimal and uniform decay rates of the wave equation subject to Cauchy Ventcel dynamical boundary conditions.

$$\begin{cases} u_{tt} - \Delta u = 0 & \text{in } \Omega \times]0,\infty[\,, \\ v_{tt} + \partial_\nu u - \Delta_\Gamma v + g(v_t) = 0 & \text{on } \Gamma_1 \times]0,\infty[\,, \\ u = v & \text{on } \Gamma \times]0,\infty[\,, \\ u = 0 & \text{on } \Gamma_0 \times]0,\infty[\,, \end{cases}$$

where Ω is a bounded domain of $\mathbb{R}^n$ $(n > 2)$ having a C^3 boundary $\partial\Omega = \Gamma$, such that $\Gamma = \Gamma_0 \cup \Gamma_1$, with Γ_0 and Γ_1 closed and disjoint.

We prove that the boundary dissipation $g(v_t)$ is strong enough to assure the asymptotic stability of the system. The results presented in the literature deal with localized dissipations acting in a strategic neighbourhood of the boundary (sometimes in the whole domain) in order to stabilize the system. In this paper we prove the reciprocal procedure (which remained an open problem), namely: to prove that a frictional dissipation acting on the boundary is strong enough, via transmission process ($u|_\Gamma = v$), to stabilize the whole system.

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