STABILIZATION OF SECOND ORDER EVOLUTION EQUATIONS BY UNBOUNDED DYNAMIC FEEDBACKS

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Abstract. In this talk, we discuss some sufficient conditions that lead to the uniform or non uniform stability of the solutions of the following closed loop system:

$$\begin{cases} x''(t) + Ax(t) + Bu(t) = 0, t \in [0, +\infty), \\ \rho u'(t) - \hat{C}u(t) - B^* x'(t) = 0, t \in [0, +\infty), \\ x(0) = x_0, x'(0) = y_0, u(0) = u_0, \end{cases} \tag{1}$$

where A is a linear unbounded positive self-adjoint operator, $x : [0, +\infty) \to X$ is the state of the system, $\hat{C}$ is a m-dissipative operator on U (X and U are two Hilbert spaces) and $u \in L^2(0, T; U)$ is the input function. System (1) provides a general framework of second order evolution equations with dynamical feedbacks covering a variety of examples. We indeed associate to our damped problem an undamped problem and prove that under certain regularity assumption,the observability properties for the undamped problem imply decay estimates for the damped one.

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