Polynomial stabilization of a cascade coupled system
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We consider a cascade coupled heat-wave system, where the control $u(t)$ acts on the heat component $z(t,x)$, which acts on the wave component $(w(t,x),w\_t(t,x))$. Our aim is to stabilize this system in closed loop, that is to come up with a feedback law $u(t) = K(z(t),w(t),w\_t(t))$ such that the associated trajectories converge to 0 as $t \to \infty$. This task is classical in the context of thermoelasticity or fluid-structure systems, where exponential and polynomial decay rates have been found, for many examples of heat-wave coupled systems. The latter systems are interconnected, while our is cascade, which requires new tools. We propose a feedback law achieving polynomial stabilization by revisiting a well-known procedure for the control/stabilization of cascade coupled ODEs: using the solution of a well-chosen Sylvester equation, one can define new coordinates in which the dynamic is uncoupled. This is joint work with P. Lissy (CERMICS) and S. Marx (LS2N).