



Optimal decay for a wave-heat system with Coleman–Gurtin thermal law

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Abstract

We study the long-term behaviour of solutions to a one-dimensional coupled wave-heat system with Coleman–Gurtin thermal law. Our approach is based on the asymptotic theory of C_0 -semigroups and recent results developed for coupled control systems. As our main results, we represent the system as a feedback interconnection between the wave part and the Coleman–Gurtin part and we show that the associated semigroup in the history framework of Dafermos is polynomially stable with optimal decay rate t^{-2} as $t \rightarrow \infty$. In particular, we obtain a sharp estimate for the rate of energy decay of classical solutions to the problem.

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