

On Neumann boundary controllability for heat conducting Reissner-Mindlin plates

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Abstract

We consider a Reissner-Mindlin plate with Green & Naghdi type II hyperbolic heat conduction modeled by a conservative system of second order PDEs. Under certain conditions on the geometry of the domain as well as physical parameters, we prove the exact solvability for the Neumann boundary controllability problem: given null Dirichlet boundary conditions on one part of the boundary, there exist Neumann L^2 -boundary controls on the other part of the boundary steering the system from an “arbitrary” initial into an “arbitrary” final state.

The proof is based on a general control theory in reflexive Banach spaces and consists in showing the admissibility of the control operator as well as an observability inequality for the dual operator. Time permitting, a generalization for the case of a Reissner-Mindlin plate with Cattaneo heat conduction will be presented.