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Boundary stabilization of thin plates

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Abstrak

Presents one of the main directions of research in the area of design and analysis of feedback stabilizers for distributed parameter systems in structural dynamics. Important progress has been made in this area, driven, to a large extent, by problems in modern structural engineering that require active feedback control mechanisms to stabilize structures which may possess only very weak natural damping. Much of the progress is due to the development of new methods to analyze the stabilizing effects of specific feedback mechanisms.

Boundary Stabilization of Thin Plates provides a comprehensive and unified treatment of asymptotic stability of a thin plate when appropriate stabilizing feedback mechanisms acting through forces and moments are introduced along a part of the edge of the plate. In particular, primary emphasis is placed on the derivation of explicit estimates of the asymptotic decay rate of the energy of the plate that are uniform with respect to the initial energy of the plate, that is, on uniform stabilization results.

The method that is systematically employed throughout this book is the use of multipliers as the basis for the derivation of a priori asymptotic estimates on plate energy. It is only in recent years that the power of the multiplier method in the context of boundary stabilization of hyperbolic partial differential equations came to be realized. One of the more surprising applications of the method appears in Chapter 5, where it is used to derive asymptotic decay rates for the energy of the nonlinear von Karman plate, even though the technique is ostensibly a linear one.