ON BOUNDARY EXACT CONTROLLABILITY OF ONE-DIMENSIONAL WAVE EQUATIONS WITH WEAK AND STRONG INTERIOR DEGENERATION

Günter Leugering[1], Peter Kogut[2], and Olga Kupenko[3]

[1]University Erlangen-Nuremberg
[2]Dnipropetrovsk National University
[3]National Technical University "Dnipro Polytechnics"

July 4, 2020

Abstract

In this paper we study exact boundary controllability for a linear wave equation with strong and weak interior degeneration of the coefficients in the principle part of the elliptic operator. The objective is to provide a well-posedness analysis of the corresponding system and derive conditions for its controllability through boundary actions. Passing to a relaxed version of the original problem, we discuss existence and uniqueness of solutions, and using the HUM method we derive conditions on the rate of degeneracy for both exact boundary controllability and the lack thereof.

Hosted file

OCP-wave-equation-internal-damage.pdf available at https://authorea.com/users/339754/articles/465906-on-boundary-exact-controllability-of-one-dimensional-wave-equations-with-weak-and-strong-interior-degeneration