Exact boundary controllability for a coupled system of wave equations with Neumann or Robin boundary controls

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In this talk, we first show the exact boundary controllability for a coupled system of wave equations with Neumann boundary controls. In order to establish the corresponding observability inequality, we introduce a compact perturbation method which does not depend on the Riesz basis property, but depends only on the continuity of projection with respect to a weaker norm. We next observe that the Neumann boundary value problem can be served to obtain the exact boundary controllability with coupled Robin boundary controls. Finally, in the case of less boundary controls, we show the non exact boundary controllability with both Neumann and coupled Robin boundary controls, respectively.