
Exponential stabilisation of piezoelectric materials via an electromagnetic field

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The present work is an extension of the work of Bidouan et al. [(2023)]. Setting of some criteria for piezoelectric materials stabilizability. Journal of Current Engineering and Technology, 5(1). ISSN: 2582-1210] in which the authors have identified 11 types of piezoelectric materials that can be stabilized by utilizing an electromagnetic field. But, Bidouan et al. (2023) did not achieve exponential stability. Here, we go further than Bidouan et al. (2023) by building on the 11 types of piezoelectric materials nonlinear feedback controls, which allow either an exponential decrease of the energy or exact controllability. Such feedback controls are built with the current density and the electric charge density in order to meet the Lyapunov's stability criteria. To this end, we use the a priori estimation technique. In addition, numerical implementation of the control reveals the complexity of the control parameters effect on the decrease profile of the energy, and opens perspectives for optimisation.