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Title: Midpoint vibration control of an elastic string via an autoregressive output feedback

Abstract: This work addresses the midpoint vibration control of an elastic string thanks to an auto-regressive output feedback. It consists of a control law based on a linear combination of the instantaneous output measurement together with the delayed output and input ones. The delay is considered here as a control parameter. Four degrees of freedom are available to address the stabilization problem of the considered wave equation, where the control is pointwise and located at the middle of the string, and the output is the velocity of this point. Relatively simple to construct, such a control law has shown to be effective in the PDE control framework for both the boundary control of the transport and wave equations. The problem under consideration results in a delay difference equation that is tackled thanks to the Multiplicity-Induced Dominance paradigm and the partial pole placement method. The effectiveness of the proposed approach is illustrated through numerical simulations and the used finite-difference scheme is detailed.