Finite time horizon mixed control of vibrational systems

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In this talk we consider a vibrational system control problem over a finite time horizon. The performance measure of the system is taken to be p-mixed H_2 norm which generalizes the standard H_2 norm. We present an algorithm for efficient calculation of this norm in the case when the system is parameter dependent and the number of inputs and outputs of the system is significantly smaller than the order of the system. Our approach is based on a novel procedure which is not based on solving Lyapunov equations and which takes into account the structure of the system. We use a characterization of the H_2 norm given in terms of integrals which we solve using adaptive quadrature rules. This enables us to use recycling strategies as well as parallelization. The efficiency of the new algorithm allows us to analyse the influence of various system parameters and different finite time horizons on the value of the p-mixed H_2 norm. We illustrate our approach by numerical examples concerning an n-mass oscillator with one damper.