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BOUNDARY FEEDBACK STABILIZATION OF A HYBRID PDE-ODE SYSTEM

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Abstract. This paper deals with boundary feedback stabilization of a variant of the SCOLE model. Namely, a flexible beam clamped at one end and free at the other end where a rigid body is attached. Using the frequency domain method, we first prove that the considered system is uniformly stabilizable when control force and control moment are simultaneously applied at the free end of the beam. Secondly when only a control force is applied, we give a sufficient condition on the physical parameters of the system to guarantee the uniform stabilization. Finally it is shown that the presence of boundary control force is necessary to achieve uniform stabilization. To verify these theoretical developments, an asymptotic analysis and numerical study of the spectrum are conducted.

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