Habib Ayadi (Monastir)

Title. Cone-bounded feedback stabilization of an Euler-Bernoulli beam.

Abstact. In practical applications, control inputs are subject to physical limitations due to actuator constraints, energy restrictions, and safety considerations. These limitations necessitate the use of bounded control inputs to ensure feasibility and reliable performance in real-world scenarios. This study investigates the well-posedness and asymptotic stabilization of a one-dimensional controlled Euler-Bernoulli beam equation. The control input, applied within the beam domain or at the boundary, is modeled as a cone-bounded function of velocity, introducing nonlinearity into the closed-loop system. Well-posedness is established using nonlinear semigroup theory, Sobolev embedding theory, and Schauder's fixed point theorem. Additionally, asymptotic stability is demonstrated through Lyapunov analysis and LaSalle's invariance principle in the context of infinite-dimensional systems.