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Reduction Theorems for Stability of Closed Sets in Finite-Dimensional Dynamical Systems, with Application in Control Theory

We investigate the Seibert–Florio reduction problem for finite-dimensional dynamical systems: given two closed positively invariant subsets of the state space, $\Gamma_1 \subset \Gamma_2$, assuming that Γ_1 is either stable, semi-attractive, or semi-asymptotically stable relative to Γ_2, find conditions under which Γ_1 enjoys the same properties relative to the state space. We present reduction theorems which extend, in the finite-dimensional setting, Seibert and Florio's results for compact Γ_1, and illustrate their relevance in Control Theory.