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Input-to-State Stability in Terms of Two Measures

Stability in terms of two measures encompasses a range of stability notions, such as partial stability, conditional stability, eventual stability, and practical stability. The concept of input-to-state stability (ISS) captures how external inputs affect the stability of control systems and has proven highly effective for stability analysis and control design in dynamical systems. This talk focuses on the two-measure version of ISS for nonlinear systems. We introduce various stability concepts for nonlinear systems and then explain the two-measure stability concept. This unified approach encourages us to examine ISS within the context of two measures, enabling analysis of external inputs' effects on entire states, partial states, periodic orbits, invariant sets, and more. Finally, we present sufficient conditions to ensure two-measure ISS for nonlinear systems and discuss potential applications of this approach.