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Set-valued Lyapunov functions for pointwise asymptotic stability

Pointwise asymptotic stability of a set, for a difference inclusion, requires that each point of the set be Lyapunov stable and that every solution to the inclusion, from a neighborhood of the set, be convergent and have the limit in the set. It is equivalent to the usual asymptotic stability for a single equilibrium, but is different in general, especially for noncompact sets of equilibria. Set-valued Lyapunov functions are set-valued mappings which characterize pointwise asymptotic stability in a way similar to how Lyapunov functions characterize the usual asymptotic stability. The talk will present necessary and sufficient conditions for pointwise asymptotic stability in terms of weak and strict set-valued Lyapunov functions.