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Stability of Planar Switched Linear Dynamical Systems

Switched dynamical systems arise when we can arbitrarily transition between different subsystems, typically modelled by autonomous ordinary differential equations (ODEs). A fundamental example involves switched systems where all subsystems are linear. Studying their stability under arbitrary switching is important for practical applications. However, even for switched linear systems, there is no set of necessary and sufficient conditions to guarantee stability under arbitrary switching for arbitrary dimension of the phase space. In this talk, we present new necessary and sufficient conditions for ensuring uniform asymptotic stability of the origin under arbitrary switching in two-dimensional switched linear systems.