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Tiffany Nicole Kolba* (tiffany.kolba@valpo.edu). *A Systematic Lyapunov Construction for Proving Noise-Induced Stabilization.*

Noise-induced stabilization occurs when an unstable deterministic system is stabilized by the addition of white noise. Proving that this phenomenon occurs for a particular system is often manifested through the construction of a global Lyapunov function. However, the procedure for constructing a Lyapunov function is often quite ad hoc, involving much time and tedium. In this talk, a systematic algorithm for the construction of a global Lyapunov function for planar systems will be presented. The general methodology is to construct a sequence of local Lyapunov functions in different regions of the plane, where the regions are delineated by different behaviors of the deterministic dynamics, and then patch the local Lyapunov functions together to form one smooth global Lyapunov function. The algorithm is applied to a model problem which displays finite time blow up in the deterministic setting in order to prove that the system exhibits noise-induced stabilization. (Received September 24, 2012)