1100-93-148 **Dylan Poulsen*** (dylan_poulsen@baylor.edu), TX, and **John M Davis** and **Ian A Gravagne**. *Stability of Markov Chains: A Time Scales Viewpoint with Applications to Control.*

We present a version of Lyapunov theory for discrete time scales where the distances between time scale points are independent random variables.

In the case of quadratic Lyapunov functions for the LTI case, our results improve the requirement that $\text{spec}(A) \subset \mathcal{H}_{\min}$, the smallest Hilger circle. Through this analysis, we encounter an interesting geometric relationship between the regions of almost sure exponential stability and mean-square stability. Specifically, the region of stochastic Lyapunov stability is the osculating circle to the region of almost sure exponential stability.

Our approach also allows us to consider a special class of LTV problems where the dependence on time is only through the distance between adjacent time scale points. As an application of these results, we consider observer-based state feedback where the time between sampling points is not known *a priori*, but has known statistical properties. In particular, we assume that the distance between sampling points is an independent sequence of random variables with known mean and variance. (Received February 06, 2014)