1100-93-185 **Ian Gravagne*** (ian_gravagne@baylor.edu), Ian Gravagne, 1 Bear Place 97356, Waco, TX 76798, and **John M. Davis**, **Matthew Mosley** and **Dylan Poulsen**. *Application of an Observer in a Linear Feedback Controller on a Stochastic Graininess Time Scale.* Preliminary report.

In practice, feedback controllers for linear or linearizeable systems sometimes cannot directly measure certain system states that are necessary for stable, high-performance control. In these cases, an observer may be useful for estimating the unmeasurable states.

Previously, it was known that system states could be reconstructed from past outputs for systems operating on a stochastic, discrete time domain; however, this result was not good enough to support real-time feedback control. Recently, co-author D. Poulsen proposed a novel observer configuration that can stabilize a state-feedback controller operating on a stochastic time domain.

This talk explores the application of the Stochastic Time Scale Observer to a state feedback problem through computer simulation. The theory is briefly developed, and then various cases are discussed as the simulator is coded to include more and more "real-world" effects that are not captured in the theory such as communications delays, dropped packets, noisy sensor readings and quantization errors. It will be shown the the proposed observer is quite robust to these effects for the system of interest, and able to stabilize the closed-loop system dynamics with knowledge only of the time scale graininess statistics. (Received February 07, 2014)