1077-60-2105 **Iulia Hociota*** (ihociot1@asu.edu), Arizona State University, Tempe, AZ 85287, and **Bruno D Welfert**, Arizona State University, Tempe, AZ 85287. *Stochastic Reduction of an SIR Model.*

The SIR model is often used to simulate the spread of contagious diseases in a given population. The contact rate between susceptible and infected populations plays a critical role in determining the outcome of the disease, yet is rarely known precisely. The contact rate is often defined in an ad-hoc way, such as a superposition of white noise accounting for random population interactions and harmonic terms corresponding to seasonal variations.

In this study we consider contact rates modeled by a Markov process varying on a fast time scale, according to a given transition probability. A direct simulation of the resulting system requires a time discretization consistent with the fast time scale and is not efficient. We present a reduction technique to enable a simulation at a slower time scale by converting information contained in the Markov process to an Ito process over larger time intervals. The main advantage in the new formulation is the scalability of the Ito increments.We illustrate the technique on the propagation of the flu with various types of transition probabilities corresponding to different noise colorings and compare results with existing studies. (Received September 21, 2011)