1125-37-184 **Ian Jordan*** (idj2@njit.edu), New Jersey Institute of Technology, and **Aminur Rahman** (ar276@njit.edu), Culimore Hall, University Avenue, Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07103. *Discrete dynamical modeling and experimental investigation of chaotic NOR gates and set/reset flip-flops.*

It has been observed through experiments and *SPICE* simulations that logical circuits based upon Chua's circuit exhibit complex dynamical behavior. Some of these circuits have been modeled as systems of ordinary differential equations. However, as the number of components in newer circuits increases so does the complexity. This renders continuous dynamical systems models impractical and necessitates new modeling techniques. In recent years some discrete dynamical models have been developed using various simplifying assumptions. To create a robust modeling framework for chaotic logical circuits, we developed both deterministic and stochastic discrete dynamical models, which exploit the natural recurrence behavior, for two chaotic NOR gates and a chaotic set/reset flip-flop (RSFF). This work presents a complete applied mathematical investigation of logical circuits. Experiments on our own designs of the above circuits are modeled and the models are rigorously analyzed and simulated showing surprisingly close qualitative agreement with the experiments. Furthermore, the models are designed to accommodate dynamics of similarly designed circuits. This will allow researchers to develop ever more complex chaotic logical circuits with a simple modeling framework. (Received August 10, 2016)