



**2005**  
**MATHEMATICS COLLOQUIUM**  
**SERIES**  
**UNIVERSITY OF CENTRAL**  
**FLORIDA**



**Prof. Shui-Nee Chow**

**OF**

**Department of Mathematics, Georgia Institute of Technology**

will speak on:

**Spike Solutions for a Singularly Perturbed Differential Equation Modeling an Electrical Circuit**

We consider a singularly perturbed system of differential equations with periodic forcing which is derived from an electrical circuit used in modulation and demodulation schemes. The system exhibits spiking phenomena over a one time period that has important application in signal processing and in the technology in communication. In this talk we are interested in the number of cycles or spikes a solution completes in one time period and the stability property of the number of spikes of a spiking solution.

We will show rigorous mathematical analysis can be developed to enable us to give a complete identification of subregions  $\{V_n\}$ ,  $n=1,2,\dots$ , in the parameter space so that in each  $V_n$  the system produces stable spiking solutions with precisely  $n$  spikes. We will also discuss Shannon limit in information theory for this class of problems.

**DATE: Friday, March 4, 2005**

**TIME: 11:00 AM – Noon**

**PLACE: Math and Physics Building, Room 233**