

Meeting: 1006, Lubbock, Texas, SS 10A, Special Session on Extinction, Periodicity, and Chaos in Population and Epidemic Models

1006-65-54 **Lih-Ing Wu Roeger*** (lih-ing.roeger@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409. *A class of nonstandard symplectic discretization methods for Lotka-Volterra system.* Preliminary report.

In this talk, we will present some nonstandard discretization methods for 2-dimensional Lotka-Volterra systems. First, we will discuss the method by W. Kahan. Then we will show how we generalized his method and produced a class of nonstandard symplectic numerical methods for the Lotka-Volterra system. These methods are shown to be symplectic with respect to a noncanonical symplectic structure. For the predator-prey system, these discretization methods have the property that the computed points do not spiral. All solutions, for positive initial conditions, give rise to periodic solutions, while many of the numerical methods, for example Euler's method, give solutions that spiral into or out of the positive-valued fixed-point. Some of these nonstandard methods preserve the positivity of the predator-prey systems. (Received January 31, 2005)