

**Meeting:** 1003, Atlanta, Georgia, MAA CP S1, MAA Session on Meeting the Challenge: Relationship Between Mathematics and Biology in the 21st Century

1003-S1-1545      **Mazen Shahin\*** (mshahin@desu.edu), 1200 N. DuPont Highway, Dover, DE 19901. *Modeling Biological Systems with Difference Equations*. Preliminary report.

In this paper we will share the pedagogy and the methodology of a course which utilizes difference equations and matrices to model biological systems. Difference equations and matrices are a sophisticated and powerful tool to model a wide range of discrete time biological systems. The methodology of this course integrates the use of computers and cooperative learning creating an interactive learning environment. We will discuss the main contents of such course and will share some computer-based activities to explore and investigate the dynamic of discrete time models in population biology for single and interacting species. Age-structured population dynamics and maximum sustainable yield will also be discussed. As an illustration for the use of research in this course, we will discuss a simple and practical method to control deterministic chaos of a system represented by a single difference equation. The method works by applying a series of proportional feedbacks on the system variable performed periodically with a certain period. This course, which does not require calculus, is appropriate for freshmen majoring in biology and mathematics. (Received October 05, 2004)