

MATHEMATICS DEPARTMENT
North Carolina State University

DIFFERENTIAL EQUATIONS SEMINAR

Wednesday, October 30, 2002
2:35 p.m. 330 Harrelson Hall

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**“Behavior of a nonlinear oscillator with
strong periodic forcing”**

In this talk, I will consider a situation in which a nonlinear oscillator is subjected to strong periodic forcing. In particular, the behavior resulting from imposition of seasonal effort harvesting in a predator-prey model (Rosenzweig-MacArthur) is studied. The resulting model is a two-dimensional nonautonomous ODE system.

Large-amplitude periodic harvesting in such biological population models typically results in richly diverse and complicated bifurcation structures. Exhaustive analysis of these structures is impossible at present, but they can be understood through numerical studies and classification of generic bifurcation sequences. High-order return maps are utilized to interpret mechanisms for some of the characteristic flow behaviors, including distinctive phase-locking regions, chaotic transients and local chaotic attractors. The construction of these return maps is similar to that of Poincaré maps, and they can reduce the essential flow behavior to the behavior of noninvertible scalar maps.

Graduate students are invited to attend.

For questions, comments, and offers to talk, contact Steve Schechter, schechter@math.ncsu.edu.
Please visit the DE Seminar web page at www.math.ncsu.edu/seminars.html.