Insect Model

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2. Category: Biology (Population Biology, Ecology)

3. Brief Description:

This application is used to simulate a simple two-age-class model for the change in numbers of an insect population. Becuase the model is nonlinear, it can exhibit a wide variety of interesting dynamical behavior including stable equilibria, limit cycles, bifurcations of fixed point cycles, strange attractors, and chaos. The application can also simulate stochastic population growth.

4. How the Application Can be Used:

Insect Model   was actually designed to be used in research on nonlinear population dynamics, but it is simple enough to be used in courses on population biology, ecology, or biological modelling. Students can work through a menu of examples or experiment with parameter values of their own. The application can be used to illustrate the concepts of equilibria, stability, limit cycles, bifurcations, complicated dynamics from simple nonlinear models, and deterministic *versus* stochastic models.

5. Developed under NeXTSTEP 2.1

6. Detailed Instructions:

Parameter values are entered into the fields and then the Reset and Start buttons are pressed. For detailed instructions and a description of the model, click the Help button in the Info submenu.

7. Comments:

With patience, some "pretty pictures" can be generated for strange attractors using many iterations. Since the program saves the entire sequence of iterations for printing, the printed graphs will will have a much higher resolution than what you see on the screen. If you have an hour (or more) of time to waste and at least 20 MB of free disk space, try running the example called "Strange attractor" with *Tf* = 500000 and then printing the result. The printed version is way cool!