

1014-92-1136

**John E Franke\*** ([franke@math.ncsu.edu](mailto:franke@math.ncsu.edu)), Department of Mathematics, Box 8205, North Carolina State University, Raleigh, NC 27695-8205. *Signature Function for Predicting Resonant and Attenuant Population Cycles.*

Populations are either enhanced via resonant cycles or suppressed via attenuant cycles by periodic environments. A signature function for predicting the response of discretely reproducing populations to periodic fluctuations of both a characteristic of the environment (carrying capacity), and a characteristic of the population (inherent growth rate) is developed. This signature function is the sign of a weighted sum of the relative strengths of the oscillations of the carrying capacity and the demographic characteristic. Periodic environments are deleterious for populations when the signature function is negative. However, positive signature functions signal favorable environments. The signature functions of six classical discrete-time single species population models are computed, and used to determine regions in parameter space that are either favorable or detrimental to the populations. The two parameter classical models include the Ricker, Beverton-Holt and Maynard Smith models. (Received September 27, 2005)