

INTERMODULAR DESCRIPTION SHEET:

UMAP Unit 653

TITLE:

THE RICKER SALMON MODEL

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MATH FIELD:

Difference equations

APPLICATION FIELD:

Ecology

TARGET AUDIENCE:

Students in a differential equations or modeling course.

ABSTRACT:

A difference equation model describing the dynamics of a salmon population was developed by W.E. Ricker in 1954. This unit derives the model, shows how it can be modified, and introduces the concept of maximum sustainable yield. It also shows how difference equations may lead to periodic and chaotic behavior, and a computer program enables one to explore the periods and chaos. The technique of dynamic programming is introduced to show how to maximize the income from fishing over a finite period.

PREREQUISITES:

Elementary differential equations.