

An introduction to structured population dynamics

Cushing, Jim M., 1942- , author

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Abstrak

Interest in the temporal fluctuations of biological populations can be traced to the dawn of civilization. How can mathematics be used to gain an understanding of population dynamics? This monograph introduces the theory of structured population dynamics and its applications, focusing on the asymptotic dynamics of deterministic models. This theory bridges the gap between the characteristics of individual organisms in a population and the dynamics of the total population as a whole.

In this monograph, many applications that illustrate both the theory and a wide variety of biological issues are given, along with an interdisciplinary case study that illustrates the connection of models with the data and the experimental documentation of model predictions. The author also discusses the use of discrete and continuous models and presents a general modeling theory for structured population dynamics.

Cushing begins with an obvious point: individuals in biological populations differ with regard to their physical and behavioral characteristics and therefore in the way they interact with their environment. Studying this point effectively requires the use of structured models. Specific examples cited throughout support the valuable use of structured models. Included among these are important applications chosen to illustrate both the mathematical theories and biological problems that have received attention in recent literature.