

The study of animal movement has always been a key element in ecological science, because it is inherently linked to critical processes that scale from individuals to populations and communities to ecosystems. Rapid improvements in biotelemetry data collection and processing technology have given rise to a variety of statistical methods for characterizing animal movement. This book serves as a comprehensive reference for the types of statistical models used to study individual-based animal movement.

Animal Movement is an essential reference for wildlife biologists, quantitative ecologists, and statisticians who seek a deeper understanding of modern animal movement models. A wide variety of modeling approaches are reconciled in the book using a consistent notation. Models are organized into groups based on how they treat the underlying spatio-temporal process of movement. Connections among approaches are highlighted to allow the reader to form a broader view of animal movement analysis and its associations with traditional spatial and temporal statistical modeling.

Key Features

- Synthesizes a vast and diverse set of literature on animal movement modeling
- Identifies fundamental connections among modeling approaches
- Reconciles the mathematical styles from many different studies in a unified, consistent set of statistical notation
- Provides sufficient detail and understanding to build new models for specific applications

After an initial overview examining the role that animal movement plays in ecology, a primer on spatial and temporal statistics provides a solid foundation for the remainder of the book. Each subsequent chapter outlines a fundamental type of statistical model utilized in the contemporary analysis of telemetry data for animal movement inference. Descriptions begin with basic traditional forms and sequentially build up to general classes of models in each category. Important background and technical details for each class of model are provided, including spatial point process models, discrete-time dynamic models, and continuous-time stochastic process models. The book also covers the essential elements for how to accommodate multiple sources of uncertainty, such as location error and latent behavior states. In addition to thorough descriptions of animal movement models, differences and connections are also emphasized to provide a broader perspective of approaches.



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