



Stochastic Foundations in Movement Ecology: Anomalous Diffusion, Front Propagation and Random Searches (Springer Series in Synergetics)

By Vicenç Méndez, Daniel Campos, Frederic Bartumeus

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This book presents the fundamental theory for non-standard diffusion problems in movement ecology. Lévy processes and anomalous diffusion have shown to be both powerful and useful tools for qualitatively and quantitatively describing a wide variety of spatial population ecological phenomena and dynamics, such as invasion fronts and search strategies.

Adopting a self-contained, textbook-style approach, the authors provide the elements of statistical physics and stochastic processes on which the modeling of movement ecology is based and systematically introduce the physical characterization of ecological processes at the microscopic, mesoscopic and macroscopic levels. The explicit definition of these levels and their interrelations is particularly suitable to coping with the broad spectrum of space and time scales involved in bio-ecological problems.

Including numerous exercises (with solutions), this text is aimed at graduate students and newcomers in this field at the interface of theoretical ecology, mathematical biology and physics.

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Review

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“This book … attempts to provide an overview of the essential mathematical, physical and modelling aspects which describe the motion of living entities at various scales. … This book is interdisciplinary, intuitive and versatile, bridging a gap between mathematics and ecology in a pedagogically sound and scientifically relevant manner, from which a broad audience may benefit.” (Paul Georgescu, zbMATH, Vol. 1295, 2014)

From the Back Cover

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