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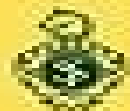
Diffusion and Ecological Problems

Modern Perspectives



Akira Okubo
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Second Edition



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Diffusion And Ecological Problems Modern Perspectives Interdisciplinary Applied Mathematics Volume 14

Francesco Russo, Pierre Vallois



Diffusion And Ecological Problems Modern Perspectives Interdisciplinary Applied Mathematics Volume 14:

Diffusion and Ecological Problems: Modern Perspectives Akira Okubo, Smon A. Levin, 2013-04-17 Surveying a wide variety of mathematical models of diffusion in the ecological context this book is written with the primary intent of providing scientists particularly physicists but also biologists with some background of the mathematics and physics of diffusion and how they can be applied to ecological problems Equally this is a specialized text book for graduates interested in mathematical ecology assuming no more than a basic knowledge of probability and differential equations Each chapter in this new edition has been substantially updated by appropriate leading researchers in the field and contains much new material covering recent developments

Proceedings "WASCOM 2007", 14th Conference on Waves and Stability in Continuous Media Roberto Monaco, 2008 This volume is the fifth in a series of proceedings which started in 1999 The contributions include the latest results on the theory of wave propagation extended thermodynamics and the stability of the solutions to partial differential equations

Lie and non-Lie Symmetries: Theory and Applications for Solving Nonlinear Models Roman M. Cherniha, 2018-07-06 This book is a printed edition of the Special Issue Lie Theory and Its Applications that was published in Symmetry

Nonlinear Reaction-Diffusion-Convection Equations Roman Cherniha, Mykola Serov, Oleksii Pliukhin, 2017-11-02 It is well known that symmetry based methods are very powerful tools for investigating nonlinear partial differential equations PDEs notably for their reduction to those of lower dimensionality e g to ODEs and constructing exact solutions This book is devoted to 1 search Lie and conditional non classical symmetries of nonlinear RDC equations 2 constructing exact solutions using the symmetries obtained and 3 their applications for solving some biologically and physically motivated problems The book summarises the results derived by the authors during the last 10 years and those obtained by some other authors

The Zoological Record, 2002 Analytic Methods for Coagulation-Fragmentation Models, Volume I Jacek Banasiak, Wilson Lamb, Philippe Laurencot, 2019-09-04 Analytic Methods for Coagulation Fragmentation Models is a two volume set that provides a comprehensive exposition of the mathematical analysis of coagulation fragmentation models Initially an in depth survey of coagulation fragmentation processes is presented together with an account of relevant early results obtained on the associated model equations These provide motivation for the subsequent detailed treatment of more up to date investigations which have led to significant theoretical developments on topics such as solvability and the long term behaviour of solutions To make the account as self contained as possible the mathematical tools that feature prominently in these modern treatments are introduced at appropriate places The main theme of Volume I is the analysis of linear fragmentation models with Volume II devoted to processes that involve the nonlinear contribution of coagulation Features of Volume I The main models of the theory together with their derivations and early methods of solution A detailed presentation of the operator theoretical methods and semigroup theory that play an essential role in the theory of fragmentation processes A comprehensive theory of fragmentation processes including

fragmentation with growth and decay in both the discrete and continuous particle size cases An analytical explanation of the pathologies of the fragmentation equation such as the shattering phase transition and non uniqueness of solutions An analysis of the long term dynamics of the discrete size fragmentation equation with growth **Encyclopedia of**

Theoretical Ecology Dr. Alan Hastings, Dr. Louis Gross, 2012-05-31 This major reference is an overview of the current state of theoretical ecology through a series of topical entries centered on both ecological and statistical themes Coverage ranges across scales from the physiological to populations landscapes and ecosystems Entries provide an introduction to broad fields such as Applied Ecology Behavioral Ecology Computational Ecology Ecosystem Ecology Epidemiology and Epidemic Modeling Population Ecology Spatial Ecology and Statistics in Ecology Others provide greater specificity and depth including discussions on the Allee effect ordinary differential equations and ecosystem services Descriptions of modern statistical and modeling approaches and how they contributed to advances in theoretical ecology are also included Succinct

uncompromising and authoritative a must have for those interested in the use of theory in the ecological sciences **Active Motion and Swarming** Pawel Romanczuk, 2011 Recently there has been an increasing focus on various biological and physical systems known as active matter Examples of such systems range from individual units such as motile cells or artificial self propelled particles to large systems of interacting active particles or individuals The emergence of large scale collective motion as exhibited by flocks of birds or bacterial colonies is just one prominent and fascinating example of self organization in active matter systems In this work we discuss different individual based models of active matter using the concept of active Brownian motion The first part of this work explores the dynamical behavior of single active particles with a particular emphasis on the impact of so called active fluctuations The second part extends the scope of this study to interacting active Brownian particles and their collective behavior First a systematic derivation of kinetic equations for active Brownian particles with velocity alignment is presented Further on motivated by recent biological observations a new type of escape pursuit model of collective motion is introduced and successfully employed in modeling collective locust behavior

Mechanistic Home Range Analysis Paul R. Moorcroft, Mark A. Lewis, 2013-10-31 Spatial patterns of movement are fundamental to the ecology of animal populations influencing their social organization mating systems demography and the spatial distribution of prey and competitors However our ability to understand the causes and consequences of animal home range patterns has been limited by the descriptive nature of the statistical models used to analyze them In Mechanistic Home Range Analysis Paul Moorcroft and Mark Lewis develop a radically new framework for studying animal home range patterns based on the analysis of correlated random walk models for individual movement behavior They use this framework to develop a series of mechanistic home range models for carnivore populations The authors analysis illustrates how in contrast to traditional statistical home range models that merely describe pattern mechanistic home range models can be used to discover the underlying ecological determinants of home range patterns observed in populations make accurate predictions

about how spatial distributions of home ranges will change following environmental or demographic disturbance and analyze the functional significance of the movement strategies of individuals that give rise to observed patterns of space use By providing researchers and graduate students of ecology and wildlife biology with a more illuminating way to analyze animal movement Mechanistic Home Range Analysis will be an indispensable reference for years to come Stochastic Calculus via Regularizations Francesco Russo, Pierre Vallois, 2022-11-15 The book constitutes an introduction to stochastic calculus stochastic differential equations and related topics such as Malliavin calculus On the other hand it focuses on the techniques of stochastic integration and calculus via regularization initiated by the authors The definitions relies on a smoothing procedure of the integrator process they generalize the usual Itô and Stratonovich integrals for Brownian motion but the integrator could also not be a semimartingale and the integrand is allowed to be anticipating The resulting calculus requires a simple formalism nevertheless it entails pathwise techniques even though it takes into account randomness It allows connecting different types of pathwise and non pathwise integrals such as Young fractional Skorohod integrals enlargement of filtration and rough paths The covariation but also high order variations play a fundamental role in the calculus via regularization which can also be applied for irregular integrators A large class of Gaussian processes various generalizations of semimartingales such that Dirichlet and weak Dirichlet processes are revisited Stochastic calculus via regularization has been successfully used in applications for instance in robust finance and on modeling vortex filaments in turbulence The book is addressed to PhD students and researchers in stochastic analysis and applications to various fields

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