Numerical Ecology

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China launches new meteorological satellite to improve weather forecast

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Cornell Cooperative Extension Students Combine Research with Service

The numerical model will be an integrated tool for daily to long ... and determining effects of ground-water withdrawals on surface water and aquatic ecology. The USGS is a neutral scientific party ...

Yakima River Basin

China on monday launched a new meteorological satellite equipped with 11 remote sensing payloads into planned orbitThe s ...

China launches new meteorological satellite

Zhuo Feng has led a team at the Institute of Deep Time Terrestrial Ecology to bring first-hand ... Their systematic modelling and numerical simulation identified unique eco-geographical effects ...

Sweeping synergy in ecological research

The satellite was launched into planned orbit from the Jiuquan Satellite Launch Centre in northwest China, state-run Xinhua news agency reported.

China launches new satellite to improve weather forecast, monitor sea temperature

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My research interests focus on understanding the consequences of spatial and temporal environmental heterogeneity on species diversity and ecosystem functioning in aquatic and terrestrial ecosystems ...

Sacramento State Faculty Jamie M. Kneitel

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Great Lakes Research Center

Global environmental change has significant impacts on social and ecological systems around the world. Global Change Ecology is an emerging field that aims to understand the ecological implications of ...

Course Descriptions

5 Department of Ecology and Evolutionary Biology, University of California, Los Angeles, Los Angeles, CA 90095, USA. 6 California NanoSystems Institute, University of California, Los Angeles, Los ...

Membrane insertion of—and membrane potential sensing by—semiconductor voltage nanosensors: Feasibility demonstration

Topics encompass ecology, evolution, and natural history ... Students work both theoretically and with computer software to analyze models, compute numerical results, and visualize outcomes.

Course Offerings

1 Key Laboratory of Vertebrate Evolution and Human Origins of the Chinese Academy of Sciences, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing 100044, ...

First systematic assessment of dental growth and development in an archaic hominin (genus, Homo) from East Asia

1 Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI 48109, USA. 2 Biostatistics, Biomathematics, Pharmacoepidemiology, and Infectious Diseases Unit, Institut ...

The impact of past vaccination coverage and immunity on pertussis resurgence

It is designed with a lifespan of eight years and will mainly obtain the atmospheric temperature, humidity, and other meteorological parameters for numerical ... and ecology to better respond ...

China launches new meteorological satellite

and other meteorological parameters for numerical prediction applications, improving China's weather forecast capacity. It will also monitor the global snow and ice coverage, sea surface temperature, ...

The book describes and discusses the numerical methods which are successfully being used for analysing ecological data, using a clear and comprehensive approach. These methods are derived from the fields of mathematical physics, parametric and nonparametric statistics, information theory, numerical taxonomy, archaeology, psychometry, sociometry, econometry and others. An updated, 3rd English edition of the most widely cited book on quantitative analysis of multivariate ecological data Relates ecological questions to methods of statistical analysis, with a clear description of complex numerical methods All methods are illustrated by examples from the ecological literature so that ecologists clearly see how to use the methods and approaches in their own research All calculations are available in R language functions

From earlier ecological studies it has become apparent that simple univariate or bivariate statistics are often inappropriate, and that multivariate statistical analyses must be applied. Despite several difficulties arising from the application of multivariate methods, community ecology has acquired a mathematical framework, with three consequences: it can develop as an exact science; it can be applied operationally as a computer-assisted science to the solution of environmental problems; and it can exchange information with other disciplines using the language of mathematics. This book comprises the invited lectures, as well as working group reports, on the NATO workshop held in Roscoff (France) to improve the applicability of this new method numerical ecology to specific ecological problems.

The book describes and discusses the numerical methods which are successfully being used for analysing ecological data, using a clear and comprehensive approach. These methods are derived from the fields of mathematical physics, parametric and nonparametric statistics, information theory, numerical taxonomy, archaeology, psychometry, sociometry, econometry and others. Compared to the first edition of Numerical Ecology, this second edition includes three new chapters, dealing with the analysis of semiquantitative data, canonical analysis and spatial analysis. New sections have been added to almost all other chapters. There are sections listing available computer programs and packages at the end of several chapters. As in the previous English and French editions, there are numerous examples from the ecological literature, and the choice of methods is facilitated by several synoptic tables.

This new edition of Numerical Ecology with R guides readers through an applied exploration of the major methods of multivariate data analysis, as seen through the eyes of three ecologists. It provides a bridge between a textbook of numerical ecology and the implementation of this discipline in the R language. The book begins by examining some exploratory approaches. It proceeds logically with the construction of the key building blocks of most methods, i.e. association measures and matrices, and then submits example data to three families of approaches: clustering, ordination and canonical ordination. The last two chapters make use of these methods to explore important and contemporary issues in ecology: the analysis of spatial structures and of community diversity. The aims of methods thus range from descriptive to explanatory and predictive and encompass a wide variety of approaches that should provide readers with an extensive toolbox that can address a wide palette of questions arising in contemporary multivariate ecological analysis. The second edition of this book features a complete revision to the R code and offers improved procedures and more diverse applications of the major methods. It also highlights important changes in the methods and expands upon topics such as multiple correspondence analysis, principal response curves and co-correspondence analysis. New features include the study of relationships between species traits and the environment, and community diversity analysis. This book is aimed at professional researchers, practitioners, graduate students and teachers in ecology, environmental science and engineering, and in related fields such as oceanography, molecular ecology, agriculture and soil science, who already have a background in general and multivariate statistics and wish to apply this knowledge to their data using the R language, as well as people willing to accompany their disciplinary learning with practical applications. People from other fields (e.g. geology, geography, paleoecology, phylogenetics, anthropology, the social and education sciences, etc.) may also benefit from the materials presented in this book. Users are invited to use this book as a teaching companion at the computer. All the necessary data files, the scripts used in the chapters, as well as extra R functions and packages written by the authors of the book, are available online (URL: http://adn.biol.umontreal.ca/~numericalecology/numecolR/).

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This collection of selected contributions gives an account of recent developments in dynamic game theory and its applications, covering both theoretical advances and new applications of dynamic games in such areas as pursuit-evasion games, ecology, and economics. Written by experts in their respective disciplines, the chapters include stochastic and differential games; dynamic games and their applications in various areas, such as ecology and economics; pursuit-evasion games; and evolutionary game theory and applications. The work will serve as a state-of-the art account of recent advances in dynamic game theory and its applications for researchers, practitioners, and advanced students in applied mathematics, mathematical finance, and engineering.

Community ecology has undergone a transformation in recent years, from a discipline largely focused on processes occurring within a local area to a discipline encompassing a much richer domain of study, including the linkages between communities separated in space (metacommunity dynamics), niche and neutral theory, the interplay between ecology and evolution (eco-evolutionary dynamics), and the influence of historical and regional processes in shaping patterns of biodiversity. To fully understand these new developments, however, students continue to need a strong foundation in the study of species interactions and how these interactions are assembled into food webs and other ecological networks. This new edition fulfils the book's original aims, both as a much-needed up-to-date and accessible introduction to modern community ecology, and in identifying the important questions that are yet to be answered. This research-driven textbook introduces state-of-the-art community ecology to a new generation of students, adopting reasoned and balanced perspectives on as-yet-unresolved issues. Community Ecology is suitable for advanced undergraduates, graduate students, and researchers seeking a broad, up-to-date coverage of ecological concepts at the community level.

Numerical Ecology with R provides a long-awaited bridge between a textbook in Numerical Ecology and the implementation of this discipline in the R language. After short theoretical overviews, the authors accompany the users through the exploration of the methods by means of applied and extensively commented examples. Users are invited to use this book as a teaching companion at the computer. The travel starts with exploratory approaches, proceeds with the construction of association matrices, then addresses three families of methods: clustering, unconstrained and canonical ordination, and spatial analysis. All the necessary data files, the scripts used in the chapters, as well as the extra R functions and packages written by the authors, can be downloaded from a web page accessible through the Springer web site(http://adn.biol.umontreal.ca/~numericalecology/numecolR/). This book is aimed at professional researchers, practitioners, graduate students and teachers in ecology, environmental science and engineering, and in related fields such as oceanography, molecular ecology, agriculture and soil science, who already have a background in general and multivariate statistics and wish to apply this knowledge to their data using the R language, as well as people willing to accompany their disciplinary learning with practical applications. People from other fields (e.g. geology, geography, paleoecology, phylogenetics, anthropology, the social and education sciences, etc.) may also benefit from the materials presented in this book. The three authors teach numerical ecology, both theoretical and practical, to a wide array of audiences, in regular courses in their Universities and in short courses given around the world. Daniel Borcard is lecturer of Biostatistics and Ecology and researcher in Numerical Ecology at Université de Montréal, Québec, Canada. François Gillet is professor of Community Ecology and Ecological Modelling at Université de Franche-Comté, Besançon, France. Pierre Legendre is professor of Quantitative Biology and Ecology at Université de Montréal, Fellow of the Royal Society of Canada, and ISI Highly Cited Researcher in Ecology/Environment.

Functional and Phylogenetic Ecology in R is designed to teach readers to use R for phylogenetic and functional trait analyses. Over the past decade, a dizzying array of tools and methods were generated to incorporate phylogenetic and functional information into traditional ecological analyses. Increasingly these tools are implemented in R, thus greatly expanding their impact. Researchers getting started in R can use this volume as a step-by-step entryway into phylogenetic and functional analyses for ecology in R. More advanced users will be able to use this volume as a quick reference to understand particular analyses. The volume begins with an introduction to the R environment and handling relevant data in R. Chapters then cover phylogenetic and functional metrics of biodiversity; null modeling and randomizations for phylogenetic and functional trait analyses; integrating phylogenetic and functional trait information; and interfacing the R environment with a popular C-based program. This book presents a unique approach through its focus on ecological analyses and not macroevolutionary analyses. The author provides his own code, so that the reader is guided through the computational steps to calculate the desired metrics. This guided approach simplifies the work of determining which package to use for any given analysis. Example datasets are shared to help readers practice, and readers can then quickly turn to their own datasets.