

Game Theory And Animal Behavior

Introduces current evolutionary game theory--where ideas from evolutionary biology and rationalistic economics meet--emphasizing the links between static and dynamic approaches and noncooperative game theory. This text introduces current evolutionary game theory--where ideas from evolutionary biology and rationalistic economics meet--emphasizing the links between static and dynamic approaches and noncooperative game theory. Much of the text is devoted to the key concepts of evolutionary stability and replicator dynamics. The former highlights the role of mutations and the latter the mechanisms of selection. Moreover, set-valued static and dynamic stability concepts, as well as processes of social evolution, are discussed. Separate background chapters are devoted to noncooperative game theory and the theory of ordinary differential equations. There are examples throughout as well as individual chapter summaries. Because evolutionary game theory is a fast-moving field that is itself branching out and rapidly evolving, Jörger Weibull has judiciously focused on clarifying and explaining core elements of the theory in an up-to-date, comprehensive, and self-contained treatment. The result is a text for second-year graduate students in economic theory, other social sciences, and evolutionary biology. The book goes beyond filling the gap between texts by Maynard-Smith and Hofbauer and Sigmund that are currently being used in the field. Evolutionary Game Theory will also serve as an introduction for those embarking on research in this area as well as a reference for those already familiar with the field. Weibull provides an overview of the developments that have taken place in this branch of game theory, discusses the mathematical tools needed to understand the area, describes both the motivation and intuition for the concepts involved, and explains why and how it is relevant to economics.

Despite originating over than two-and-a-half thousand years ago, Aesop's Fables are still passed on from parent to child, and are embedded in our collective consciousness. The morals we have learned from these tales continue to inform our judgements, but have the stories also informed how we regard their animal protagonists? If so, is there any truth behind the stereotypes? Are wolves deceptive villains? Are crows insightful geniuses? And could a tortoise really beat a hare in a race? In Aesop's Animals, zoologist Jo Wimpenny turns a critical eye to the fables to discover whether there is any scientific truth to Aesop's portrayal of the animal kingdom. She brings the tales into the twenty-first century, introducing the latest findings on some of the most fascinating branches of ethological research – the study of why animals do the things they do. In each chapter she interrogates a classic fable and a different topic – future planning, tool use, self-recognition, cooperation and deception – concluding with a verdict on the veracity of each fable's portrayal from a scientific perspective. By sifting fact from fiction in one of the most beloved texts of our culture, Aesop's Animals explores and challenges our preconceived notions about animals, the way they behave, and the roles we both play in our shared world.

This book introduces game theory and its applications from an applied mathematician's perspective, systematically developing tools and concepts for game-theoretic modelling in the life and social sciences. Filled with down-to-earth examples of strategic behavior in humans and other animals, the book presents a unified account of the central ideas of both classical and evolutionary game theory. Unlike many books on game theory, which focus on mathematical and recreational aspects of the subject, this book emphasizes using games to answer questions of current scientific interest. In the present third edition, the author has added substantial new material on evolutionarily stable strategies and their use in behavioral ecology. The only prerequisites are calculus and some exposure to matrix algebra, probability, and differential equations.

We are rarely asked to make decisions based on only one criterion; most often, decisions are based on several usually conflicting, criteria. In nature, if the design of a system evolves to some final, optimal state, then it must include a balance for the interaction of the system with its surroundings certainly a design based on a variety of criteria. Furthermore, the diversity of nature's designs suggests an infinity of such optimal states. In another sense, decisions simultaneously optimize a finite number of criteria, while there is usually an infinity of optimal solutions. Multicriteria optimization provides the mathematical framework to accommodate these demands. Multicriteria optimization has its roots in mathematical economics, in particular, in consumer economics as considered by Edgeworth and Pareto. The critical question in an exchange economy concerns the "equilibrium point" at which each of N consumers has achieved the best possible deal for himself or herself. Ultimately, this is a collective decision in which any further gain by one consumer can occur only at the expense of at least one other consumer. Such an equilibrium concept was first introduced by Edgeworth in 1881 in his book on mathematical psychics. Today, such an optimum is variously called "Pareto optimum" (after the Italian-French welfare economist who continued and expanded Edgeworth's work), "effi. cient," "nondominated," and so on.

Multicriteria Optimization in Engineering and in the Sciences

Animal Behaviour: A Very Short Introduction

Conceptual Breakthroughs in Ethology and Animal Behavior

Game Theory Evolving

The Science Behind the Fables

Game Theory and Fisheries Management

Covering the major topics of evolutionary game theory, Game-Theoretical Models in Biology presents both abstract and practical mathematical models of real biological situations. It discusses the static aspects of game theory in a mathematically rigorous way that is appealing to mathematicians. In addition, the authors explore many applications of game theory to biology, making the text useful to biologists as well. The book describes a wide range of topics in evolutionary games, including matrix games, replicator dynamics, the hawk-dove game, and the prisoner's dilemma. It covers the evolutionarily stable strategy, a key concept in biological games, and offers in-depth details of the mathematical models. Most chapters illustrate how to use MATLAB® to solve various games. Important biological phenomena, such as the sex ratio of so many species being close to a half, the evolution of cooperative behavior, and the existence of adornments (for example, the peacock's tail), have been explained using ideas underpinned by game theoretical modeling. Suitable for readers studying and working at the interface of mathematics and the life sciences, this book shows how evolutionary game theory is used in the modeling of these diverse biological phenomena. Now in paperback, Did Darwin Get It Right discusses some of the hottest issues in biology today. Its author, the eminently quotable John Maynard Smith, discusses such fascinating conundrums as how life began, whether the brain works like a computer, why most animals and plants reproduce sexually, and how social behavior evolved out of the context of natural selection--a process which would seem to favor selfishness. A humorous and insightful writer, John Maynard Smith has the special ability to convey the excitement of science, its complexity and fascination, without baffling or boring his readers. In these 28 brief and accessible essays, Maynard ranges widely over such issues as science and the media, the birth of sociobiology, the evolution of animal intelligence and the limitations of evolutionary theory. For his work on the evolution of sex, Smith won the Darwin medal from the Royal Society, and he has pioneered the application of game theory to animal behavior.

The essential textbook for learning game theory strategies Game Theory in Action is a textbook about using game theory across a range of real-life scenarios. From traffic accidents to the sex lives of lizards, Stephen Schecter and Herbert Gintis show students how game theory can be applied in diverse areas including animal behavior, political science, and economics. The book's examples and problems look at such fascinating topics as crime-control strategies, climate-change negotiations, and the power of the Oracle at Delphi. The text includes a substantial treatment of evolutionary game theory, where strategies are not chosen through

rational analysis, but emerge by virtue of being successful. This is the side of game theory that is most relevant to biology; it also helps to explain how human societies evolve. Aimed at students who have studied basic calculus and some differential equations, *Game Theory in Action* is the perfect way to learn the concepts and practical tools of game theory. Aimed at students who have studied calculus and some differential equations Examples are drawn from diverse scenarios, ranging from traffic accidents to the sex lives of lizards A substantial treatment of evolutionary game theory Useful problem sets at the end of each chapter

Over the last 25 years, evolutionary game theory has grown with theoretical contributions from the disciplines of mathematics, economics, computer science and biology. It is now ripe for applications. In this book, Daniel Friedman---an economist trained in mathematics---and Barry Sinervo---a biologist trained in mathematics---offer the first unified account of evolutionary game theory aimed at applied researchers. They show how to use a single set of tools to build useful models for three different worlds: the natural world studied by biologists; the social world studied by anthropologists, economists, political scientists and others; and the virtual world built by computer scientists and engineers. The first six chapters offer an accessible introduction to core concepts of evolutionary game theory. These include fitness, replicator dynamics, sexual dynamics, memes and genes, single and multiple population games, Nash equilibrium and evolutionarily stable states, noisy best response and other adaptive processes, the Price equation, and cellular automata. The material connects evolutionary game theory with classic population genetic models, and also with classical game theory. Notably, these chapters also show how to estimate payoff and choice parameters from the data. The last eight chapters present exemplary game theory applications. These include a new coevolutionary predator-prey learning model extending rock-paper-scissors; models that use human subject laboratory data to estimate learning dynamics; new approaches to plastic strategies and life cycle strategies, including estimates for male elephant seals; a comparison of machine learning techniques for preserving diversity to those seen in the natural world; analyses of congestion in traffic networks (either internet or highways) and the "price of anarchy"; environmental and trade policy analysis based on evolutionary games; the evolution of cooperation; and speciation. As an aid for instruction, a web site provides downloadable computational tools written in the R programming language, Matlab, Mathematica and Excel.

The Survival Game

An Undercover Investigation of the Evolution and Economics of Human Relationships

Model Systems in Behavioral Ecology

Games Primates Play

Did Darwin Get It Right?

How Game Theory Explains the Biology of Cooperation and Competition

Game theory is central to understanding human behavior and relevant to all of the behavioral sciences—from biology and economics, to anthropology and political science. However, as *The Bounds of Reason* demonstrates, game theory alone cannot fully explain human behavior and should instead complement other key concepts championed by the behavioral disciplines. Herbert Gintis shows that just as game theory without broader social theory is merely technical bravado, so social theory without game theory is a handicapped enterprise. This edition has been thoroughly revised and updated.

Reinvigorating game theory, *The Bounds of Reason* offers innovative thinking for the behavioral sciences.

A zoologist and psychologist delves deeply into the biological explanation for the root cause of human decision-making and discovers survival strategies that have been lurking in the genes since the dawn of the species. Reprint. 15,000 first printing.

Accessible, informative, and enjoyable treatment discusses the application of the ideas and methods of game theory and mathematical modeling to such areas as evolution, sex, animal behavior, and aggression. "Excellent." — *Nature*

How can we make better sense of animal behavior by using what we know about the brain? This is the first book that attempts to answer this important question by applying neural network theory. Scientists create Artificial Neural Networks (ANNs) to make models of the brain. These networks mimic the architecture of a nervous system by connecting elementary neuron-like units into networks in which they stimulate or inhibit each other's activity in much the same way neurons do. This book shows how scientists can employ ANNs to analyze animal behavior, explore the general principles of the nervous systems, and test potential generalizations among species. The authors focus on simple neural networks to show how ANNs can be investigated by math and by computers. They demonstrate intuitive concepts that make the operation of neural networks more accessible to nonspecialists. The first chapter introduces various approaches to animal behavior and provides an informal introduction to neural networks, their history, and their potential advantages. The second chapter reviews artificial neural networks, including biological foundations, techniques, and applications. The following three chapters apply neural networks to such topics as learning and development, classical instrumental condition, and the role of genes in building brain networks. The book concludes by comparing neural networks to other approaches. It will appeal to students of animal behavior in many disciplines. It will also interest neurobiologists, cognitive scientists, and those from other fields who wish to learn more about animal behavior.

Evolution and the Theory of Games

Aesop's Animals

concepts and frontiers

Neural Networks and Animal Behavior

Evolutionary Games in Natural, Social, and Virtual Worlds

Theory and Applications

Field and Laboratory Exercises in Animal Behavior is an interactive laboratory manual for students in animal behavior, ethology, and behavioral ecology. It is the first of its kind in this subject area that guides students through the diverse and fascinating fields of behavioral and ethological studies, employing a wide array of organisms as model systems for the study of behavior. Students participate in the development of hypothesis and turn the recording, analysis, and interpretation of data into an active and engaging process. A teacher-friendly companion website provides extensive teaching notes on the background to each lab project,

tips and hints for successful project presentation, sources for studying organisms, ideas for variations in labs, and alternate study organisms. This text is recommended for undergraduate courses in Animal Behavior, Ethology, and Behavioral Ecology. Provides fully developed and tested laboratory exercises Offers both field and lab experiences- adaptable for fall, spring, or summer courses Laboratories emphasize student thought and involvement in experimental design Includes an online supplement to the manual for teachers

Encyclopedia of Animal Behavior, Second Edition, the latest update since the 2010 release, builds upon the solid foundation established in the first edition. Updated sections include Host-parasite interactions, Vertebrate social behavior, and the introduction of "overview essays" that boost the book's comprehensive detail. The structure for the work is modified to accommodate a better grouping of subjects. Some chapters have been reshuffled, with section headings combined or modified. Represents a one-stop resource for scientifically reliable information on animal behavior Provides comparative approaches, including the perspective of evolutionary biologists, physiologists, endocrinologists, neuroscientists and psychologists Includes multimedia features in the online version that offer accessible tools to readers looking to deepen their understanding

A wealth of research in recent decades has seen the economic approach to human behavior extended over many areas previously considered to belong to sociology, political science, law, and other fields. Research has also shown that economics can provide insight into many aspects of sports, including soccer. Beautiful Game Theory is the first book that uses soccer to test economic theories and document novel human behavior. In this brilliant and entertaining book, Ignacio Palacios-Huerta illuminates economics through the world's most popular sport. He offers unique and often startling insights into game theory and microeconomics, covering topics such as mixed strategies, discrimination, incentives, and human preferences. He also looks at finance, experimental economics, behavioral economics, and neuroeconomics. Soccer provides rich data sets and environments that shed light on universal economic principles in interesting and useful ways. Essential reading for students, researchers, and sports enthusiasts, Beautiful Game Theory is the first book to show what soccer can do for economics.

This handbook provides both an overview of state-of-the-art scholarship in philosophy of science, as well as a guide to new directions in the discipline. Section I contains broad overviews of the main lines of research and the state of established knowledge in six principal areas of the discipline, including computational, physical, biological, psychological and social sciences, as well as general philosophy of science. Section II covers what are considered to be the traditional topics in the philosophy of science, such as causation, probability, models, ethics and values, and explanation. Section III identifies new areas of investigation that show promise of becoming important areas of research, including the philosophy of astronomy and astrophysics, data, complexity theory, neuroscience, simulations, post-Kuhnian philosophy, post-empiricist epistemology, and emergence. Most chapters are accessible to scientifically educated non-philosophers as well as to professional philosophers, and the contributors - all leading researchers in their field -- bring diverse perspectives from the North American, European, and Australasian research communities. This volume is an essential resource for scholars and students.

An Introduction to Game-Theoretic Modelling: Third Edition

Game Theory and the Unification of the Behavioral Sciences - Revised Edition

Game-Theoretical Models in Biology

Mechanisms, Function and Evolution

Reliability and Deception in Signaling Systems

How Soccer Can Help Economics

An updated view of animal behavior studies, featuring global experts The Behavior of Animals, Second Edition provides a broad overview of the current state of animal behavior studies. This thorough textbook features contributions from international experts and shares six new chapters within its revised edition. Readers will find chapters that begin with an introduction to a specific topic, such as animal cognition, and conclude with student exercises or research projects related to animal behavior. Engaging material is supported by color illustrations, informative callouts, and the accessible presentation of technical information. Provides an introduction to the study of animal behavior Features new chapters on animals' hormones and their behavior; individuality; making decisions; language; human evolution; and the use and abuse of primate models for human behavior Looks at an extensive scope of topics—from animal learning to mating Explores the evolution of animal behavior as well as human evolution Students will benefit from an updated textbook where a variety of contributors provide their expertise and global perspective in specialized areas.

Contests are an important aspect of the lives of diverse animals, from sea anemones competing for space on a rocky shore to fallow deer stags contending for access to females. Why do animals fight? What determines when fights stop and which contestant wins? Addressing fundamental questions on contest behaviour, this volume presents theoretical and empirical perspectives across a range of species. The historical development of contest research, the evolutionary theory of both dyadic and multiparty contests, and approaches to experimental design and data analysis are discussed in the first chapters. This is followed by reviews of research in key animal taxa, from the use of aerial displays and assessment rules in butterflies and the developmental biology of weapons in beetles, through to interstate warfare in humans. The final chapter considers future directions and applications of contest research, making this a comprehensive resource for both graduate students and researchers in the field.

Fish travel in schools, birds migrate in flocks, honeybees swarm, and ants build trails. How and why do these collective behaviors occur? Exploring how coordinated group patterns emerge from individual interactions, Collective Animal Behavior reveals why animals produce group behaviors and examines their evolution across a range of species. Providing a synthesis of mathematical modeling, theoretical biology, and experimental work, David Sumpter investigates how animals move and arrive together, how they transfer information, how they make decisions and synchronize their activities, and how they build

collective structures. Sumpter constructs a unified appreciation of how different group-living species coordinate their behaviors and why natural selection has produced these groups. For the first time, the book combines traditional approaches to behavioral ecology with ideas about self-organization and complex systems from physics and mathematics. Sumpter offers a guide for working with key models in this area along with case studies of their application, and he shows how ideas about animal behavior can be applied to understanding human social behavior. Containing a wealth of accessible examples as well as qualitative and quantitative features, Collective Animal Behavior will interest behavioral ecologists and all scientists studying complex systems.

Two MIT economists show how game theory—the ultimate theory of rationality—explains irrational behavior We like to think of ourselves as rational. This idea is the foundation for classical economic analysis of human behavior, including the awesome achievements of game theory. But as behavioral economics shows, most behavior doesn't seem rational at all—which, unfortunately, to cast doubt on game theory's real-world credibility. In Hidden Games, Moshe Hoffman and Erez Yoeli find a surprising middle ground between the hyperrationality of classical economics and the hyper-irrationality of behavioral economics. They call it hidden games. Reviving game theory, Hoffman and Yoeli use it to explain our most puzzling behavior, from the mechanics of Stockholm syndrome and internalized misogyny to why we help strangers and have a sense of fairness. Fun and powerfully insightful, Hidden Games is an eye-opening argument for using game theory to explain all the irrational things we think, feel, and do.

Decisions, Interaction and Evolution

Game Theory in Biology

The Evolution of Animal Communication: Reliability and Deception in Signaling Systems

An Introduction to Classical and Evolutionary Models

Animal Contests

A primatologist examines unspoken social customs, from jilting a lover to being competitive on the job, to explain how behavioral complexities are linked to humans' primate heritage.

How animals behave is crucial to their survival and reproduction. The application of new molecular tools such as DNA fingerprinting and genomics is causing a revolution in the study of animal behaviour, while developments in computing and image analysis allow us to investigate behaviour in ways never previously possible. By combining these with the traditional methods of observation and experiments, we are now learning more about animal behaviour than ever before. In this Very Short Introduction Tristram D. Wyatt discusses how animal behaviour has evolved, how behaviours develop in each individual (considering the interplay of genes, epigenetics, and experience), how we can understand animal societies, and how we can explain collective behaviour such as swirling flocks of starlings. Using lab and field studies from across the whole animal kingdom, he looks at mammals, butterflies, honeybees, fish, and birds, analysing what drives behaviour, and exploring instinct, learning, and culture. Looking more widely at behavioural ecology, he also considers some aspects of human behaviour.

ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

This encyclopedia provides an authoritative single source for understanding and applying the concepts of complexity theory together with the tools and measures for analyzing complex systems in all fields of science and engineering. It links fundamental concepts of mathematics and computational sciences to applications in the physical sciences, engineering, biomedicine, economics and the social sciences.

The principles of game theory apply to a wide range of topics in biology. This book presents the central concepts in evolutionary game theory and provides an authoritative and up-to-date account. The focus is on concepts that are important for biologists in their attempts to explain observations. This strong connection between concepts and applications is a recurrent theme throughout the book which incorporates recent and traditional ideas from animal psychology, neuroscience, and machine learning that provide a mechanistic basis for behaviours shown by players of a game. The approaches taken to modelling games often rest on idealized and unrealistic assumptions whose limitations and consequences are not always appreciated. The authors provide a novel reassessment of the field, highlighting how to overcome limitations and identifying future directions. Game Theory in Biology is an advanced textbook suitable for graduate level students as well as professional researchers (both empiricists and theoreticians) in the fields of behavioural ecology and evolutionary biology. It will also be of relevance to a broader interdisciplinary audience including psychologists and neuroscientists.

The Oxford Handbook of Philosophy of Science

Explorations in Ecology, Evolution and Behavior

Hidden Games

The Bounds of Reason

Game Theory, Alive

Integrating Conceptual, Theoretical, and Empirical Approaches

Game Theory and Animal BehaviorOxford University Press

Gull chicks beg for food from their parents. Peacocks spread their tails to attract potential mates. Meerkats alert family members of the approach of predators. But are these--and other animals--sometimes dishonest? That's what William Searcy and Stephen Nowicki ask in *The Evolution of Animal Communication*. They take on the fascinating yet perplexing question of the dependability of animal signaling systems. The book probes such phenomena as the begging of nesting birds, alarm calls in squirrels and primates, carotenoid coloration in fish and birds, the calls of frogs and toads, and weapon displays in crustaceans. Do these signals convey accurate information about the signaler, its future behavior, or its environment? Or do they mislead receivers in a way that benefits the signaler? For example, is the begging chick really hungry as its cries indicate or is it lobbying to get more food than its brothers and sisters? Searcy and Nowicki take on these and other questions by developing clear definitions of key issues, by reviewing the most relevant empirical data and game theory models available, and by asking how well theory matches data. They find that animal communication is largely reliable--but that this basic reliability also allows the clever deceiver to flourish. Well researched and clearly written, their book provides new insight into animal communication, behavior, and evolution.

This 1982 book is an account of an alternative way of thinking about evolution and the theory of games. Exploring Animal Behavior in Laboratory and Field, Second Edition provides a comprehensive manual on animal behavior lab activities. This new edition brings together basic research and methods, presenting applications and problem-solving techniques. It provides all the details to successfully run designed activities while also offering flexibility and ease in setup. The exercises in this volume address animal behavior at all levels, describing behavior, theory, application and communication. Each lab provides details on how to successfully run the activity while also offering flexibility to instructors. This is an important resource for students educators, researchers and practitioners who want to explore and study animal behavior. The field of animal behavior has changed dramatically in the past 15 - 20 years, including a greater use and availability of technology and statistical analysis. In addition, animal behavior has taken on a more applied role in the last decade, with a greater emphasis on conservation and applied behavior, hence the necessity for new resources on the topic. Offers an up-to-date representation of animal behavior Examines ethics and approvals for the study of vertebrate animals Includes contributions from a large field of expertise in the Animal Behavior Society Provides a flexible resource that can be used as a laboratory manual or in a flipped classroom setting

Encyclopedia of Animal Cognition and Behavior

Games of Life

The Behavior of Animals

The Surprising Power of Game Theory to Explain Irrational Human Behavior

A Problem-Centered Introduction to Modeling Strategic Interaction, Second Edition

Beautiful Game Theory

This encyclopedia, representing one of the most multi-disciplinary areas of research, is a comprehensive examination of the key areas in animal cognition and behavior. It will serve as a complementary resource to the handbooks and journals that have emerged in the last decade on this topic, and will be a useful resource for student and researcher alike. With comprehensive coverage of this field, key concepts will be explored. These include social cognition, prey and predator detection, habitat selection, mating and parenting, development, genetics, physiology, memory, learning and perception. Attention is also given to animal-human co-evolution and interaction, and animal welfare. All entries are under the purview of acknowledged experts in the field.

Since its original publication in 2000, Game Theory Evolving has been considered the best textbook on evolutionary game theory.

This completely revised and updated second edition of Game Theory Evolving contains new material and shows students how to apply game theory to model human behavior in ways that reflect the special nature of sociality and individuality. The textbook continues its in-depth look at cooperation in teams, agent-based simulations, experimental economics, the evolution and diffusion of preferences, and the connection between biology and economics. Recognizing that students learn by doing, the textbook introduces principles through practice. Herbert Gintis exposes students to the techniques and applications of game theory through a wealth of sophisticated and surprisingly fun-to-solve problems involving human and animal behavior. The second edition includes solutions to the problems presented and information related to agent-based modeling. In addition, the textbook incorporates instruction in using mathematical software to solve complex problems. Game Theory Evolving is perfect for graduate and upper-level undergraduate economics students, and is a terrific introduction for ambitious do-it-yourselfers throughout the behavioral sciences. Revised and updated edition relevant for courses across disciplines Perfect for graduate and upper-level undergraduate economics courses Solutions to problems presented throughout Incorporates instruction in using computational software for complex problem solving Includes in-depth discussions of agent-based modeling

We live in a highly connected world with multiple self-interested agents interacting and myriad opportunities for conflict and cooperation. The goal of game theory is to understand these opportunities. This book presents a rigorous introduction to the mathematics of game theory without losing sight of the joy of the subject. This is done by focusing on theoretical highlights (e.g., at least six Nobel Prize winning results are developed from scratch) and by presenting exciting connections of game theory to other fields such as computer science (algorithmic game theory), economics (auctions and matching markets), social choice (voting theory), biology (signaling and evolutionary stability), and learning theory. Both classical topics, such as zero-sum games, and modern topics, such as sponsored search auctions, are covered. Along the way, beautiful mathematical tools used in game theory are introduced, including convexity, fixed-point theorems, and probabilistic arguments. The book is appropriate for a first course in game theory at either the undergraduate or graduate level, whether in mathematics, economics, computer science, or statistics. The importance of game-theoretic thinking transcends the academic setting—for every action we take, we must consider not only its direct effects, but also how it influences the incentives of others.

Conceptual Breakthroughs in Ethology and Animal Behavior highlights, through concise summaries, the most important discoveries and scientific revolutions in animal behavior. These are assessed for their relative impact on the field and their significance to the forward motion of the science of animal behavior. Eighty short essays capture the moment when a new concept emerged or a publication signaled a paradigm shift. How the new understanding came about is explained, and any continuing controversy or scientific conversation on the issue is highlighted. Behavior is a rich and varied field, drawing on genetics, evolution, physiology, and ecology to inform its principles, and this book embraces the wealth of knowledge that comes from the unification of these fields around the study of animals in motion. The chronological organization of the essays makes this an excellent overview of the history of animal behavior, ethology, and behavioral ecology. The work includes such topics as Darwin's role in shaping the study of animal behavior, the logic of animal contests, cognition, empathy in animals, and animal personalities. Succinct accounts of new revelations about behavior through scientific investigation and scrutiny reveal the fascinating story of this field. Similar to Dr. John Avise's Contemporary Breakthroughs in Evolutionary Genetics, the work is structured into vignettes that describe the conceptual revolution and assess the impact of the conceptual change, with a score, which ranges from 1-10, providing an assessment of the impact of the new findings on contemporary science. Features a lively, brisk writing style and brief entries to enable easy, enjoyable access to this essential information Includes topics that cover the range of behavioral biology from mechanism to behavioral ecology Can also be

used as supplemental material for an undergraduate animal behavior course, or as the foundational text for an upper level or graduate discussion course in advanced animal behavior

Encyclopedia of Animal Behavior

Principles of Animal Behavior

Collective Animal Behavior

Essays on Games, Sex and Evolution

Exploring Animal Behavior in Laboratory and Field

Game Theory in Action

The outstanding feature of this book is that it provides a unified account of three types of decision problem. It covers the basic ideas of decision theory, classical game theory, and evolutionary game theory in one volume. No background knowledge of economics or biology is required as examples have been carefully selected for their accessibility. Detailed solutions to the numerous exercises are provided at the back of the book, making it ideal for self-study. This introduction to game theory is intended as a first course for undergraduate students of mathematics, but it will also interest advanced students or researchers in biology and economics.

Animal Behavior, Second Edition, covers the broad sweep of animal behavior from its neurological underpinnings to the importance of behavior in conservation. The authors, Michael Breed and Janice Moore, bring almost 60 years of combined experience as university professors to this textbook, much of that teaching animal behavior. An entire chapter is devoted to the vibrant new field of behavior and conservation, including topics such as social behavior and the relationship between parasites, pathogens, and behavior. Thoughtful coverage has also been given to foraging behavior, mating and parenting behavior, anti-predator behavior, and learning. This text addresses the physiological foundations of behavior in a way that is both accessible and inviting, with each chapter beginning with learning objectives and ending with thought-provoking questions. Additionally, special terms and definitions are highlighted throughout. Animal Behavior provides a rich resource for students (and professors) from a wide range of life science disciplines. Provides a rich resource for students and professors from a wide range of life science disciplines Updated and revised chapters, with at least 50% new case studies and the addition of contemporary in-text examples Expanded and updated coverage of animal welfare topics Includes behavior and homeostatic mechanisms, behavior and conservation, and behavioral aspects of disease Available lab manual with fully developed and tested laboratory exercises Companion website includes newly developed slide sets/templates (PowerPoints) coordinated with the book This up-to-date review examines key areas of animal behaviour, including communication, cognition, conflict, cooperation, sexual selection and behavioural variation. Various tests are covered, including recent empirical examples.

This book is the first to present in a systematic manner the application of game theory to fisheries management at both international and national levels. Strategic interaction among fishers and nations exploiting fishery resources is an inescapable fact of life. This has long been recognized at the international level, and is becoming increasingly recognized at the national/regional level. It follows, therefore, that, in order to be able to analyse effectively the management of these resources, the theory of strategic interaction- game theory- must be brought to bear. In this book the step-by-step development of the game theory is accompanied by numerous applications to the real world of fisheries management policy. As such, it is designed to appeal to policy makers and stakeholders, as well as to graduate students in Economics.

Field and Laboratory Exercises in Animal Behavior

Game Theory and Animal Behavior

Animal Behaviour: Evolution and Mechanisms

Third International Student Edition

Encyclopedia of Complexity and Systems Science

Evolutionary Game Theory

Principles of Animal Behavior has long been considered the most current and engaging introduction to animal behavior. The Third Edition is now also the most comprehensive and balanced in its approach to the theoretical framework behind how biologists study behavior.

Game theory has revolutionized the study of animal behavior. The fundamental principle of evolutionary game theory--that the strategy adopted by one individual depends on the strategies exhibited by others--has proven a powerful tool in uncovering the forces shaping otherwise mysterious behaviors. In this volume, the first since 1982 devoted to evolutionary game theory, leading researchers describe applications of the theory to diverse types of behavior, providing an overview of recent discoveries and a synthesis of current research. The volume begins with a clear introduction to game theory and its explanatory scope. This is followed by a series of chapters on the use of game theory to understand a range of behaviors: social foraging, cooperation, animal contests, communication, reproductive skew and nepotism within groups, sibling rivalry, alternative life-histories, habitat selection, trophic-level interactions, learning, and human social behavior. In addition, the volume includes a discussion of the relations among game theory, optimality, and quantitative genetics, and an assessment of the overall utility of game theory to the study of social behavior. Presented in a manner accessible to anyone interested in animal behavior but not necessarily trained in the mathematics of game theory, the book is intended for a wide audience of undergraduates, graduate students, and professional biologists pursuing the evolutionary analysis of animal behavior.

A key way that behavioral ecologists develop general theories of animal behavior is by studying one species or a closely related group of species--"model systems"--over a long period. This book brings together some of the field's most respected researchers to describe why they chose their systems, how they integrate theoretical, conceptual, and empirical work, lessons for the practice of the discipline, and potential avenues of future research. Their model systems

encompass a wide range of animals and behavioral issues, from dung flies to sticklebacks, dolphins to African wild dogs, from foraging to aggression, territoriality to reproductive suppression. Model Systems in Behavioral Ecology offers an unprecedented "systems" focus and revealing insights into the confluence of personal curiosity and scientific inquiry. It will be an invaluable text for behavioral ecology courses and a helpful overview--and a preview of coming developments--for advanced researchers. The twenty-five chapters are divided into four sections: insects and arachnids, amphibians and reptiles, birds, and mammals. In addition to the editor, the contributors include Geoff A. Parker, Thomas D. Seeley, Naomi Pierce, Kern Reeve, Gerald S. Wilkinson, Bert Hölldobler and Flavio Roces, George W. Uetz, Michael J. Ryan and Gil Rosenthal, Judy Stamps, H. Carl Gerhardt, Barry Sinervo, Robert Warner, Manfred Milinski, David F. Westneat, Alan C. Kamil and Alan B. Bond, Paul Sherman, Jerram L. Brown, Anders Pape Møller, Marc Bekoff, Richard C. Connor, Joan B. Silk, Christopher Boesch, Scott Creel, A.H. Harcourt, and Tim Caro and M. J. Kelly.

Game Theory

Animal Behavior