A Model World

Sixth edition of the hugely successful, internationally recognised textbook on global public health and epidemiology comprehensively covering the scope, methods, and practice of the discipline.

The emphasis of this book lies in the teaching of mathematical modeling rather than simply presenting models. To this end the book starts with the simple discrete exponential growth model as a building block, and successively refines it. This involves adding variable growth rates, multiple variables, fitting growth rates to data, including random elements, testing exactness of fit, using computer simulations and moving to a continuous setting. No advanced knowledge is assumed of the reader, making this book suitable for elementary modeling courses. The book can also be used to supplement courses in linear algebra, differential equations, probability theory and statistics.

Uneconomic Economics and the Crisis of the Model WorldSpringer

With the advent of the National Curriculum, computer based modelling CBM is now a compulsory part of the school curriculum. Teachers are increasingly being encouraged to seek out opportunities for CBM in their own subject and across the curriculum. The new demands on the curriculum have left eachers and teacher trainers concerned as to their lack of experience in the area. This book sets out to provide a comprehensive guide to the area through an examination of a number of funded projects on CBM and their application to the school curriculum, setting them in the context of wider theoretical and practical concerns. It is acknowledged that computers bring about change in the classroom, both in teachers' professional development and innovative practices in teaching and learning. In highlighting how CBM can aid in the effective delivery of the curriculum, this book should be essential reading for teachers and researchers in the field.

Environmental science (ecology, conservation, and resource management) is an increasingly quantitative field. This accessible textbook introduces quantitative ecology in a manner that aims to confront the limitations of the current literature and thereby appeal to a far wider audience.

The World In Your Head: A Gestalt View of the Mechanism of Conscious Experience represents a bold assault on one of the greatest unsolved mysteries in science: the nature of consciousness and the human mind. Rather than examining the brain and nervous system to see what they tell us about the mind, this book begins with an examination of conscious experience to see what it can tell us about the brain. Through this analysis, the first and most obvious observation is that consciousness appears as a volumetric spatial void, containing colored objects and surfaces. This reveals that the representation in the brain takes the form of an explicit volumetric spatial model of external reality. Therefore, the world we see around us is not the real world itself, but merely a miniature virtual-reality replica of that world in an internal representation. In fact, the phenomena of dreams and hallucinations clearly demonstrate the capacity of the brain to construct complete virtual worlds even in the absence of sensory input. Perception is somewhat like a guided hallucination, based on sensory stimulation. This insight allows us to examine the world of visual experience not as scientists exploring the external world, but as perceptual scientists examining a rich and complex internal representation. This unique approach to investigating mental function has implications in a wide variety of related fields, including the nature of language and abstract thought, and motor control and behavior. It also has implications to the world of music, art, and dance, showing how the patterns of regularity and periodicity in space and time--apparent in those aesthetic domains--reflect the periodic basis set of the underlying harmonic resonance representation in the brain.

What is the correct concept behind measures of inflation? Does money cause business activity or is it the other way around? Shall we stimulate growth by raising aggregate demand or rather by lowering taxes and thereby providing incentives to produce? Policy-relevant questions such as these are of immediate and obvious importance to the welfare of societies. The standard approach in dealing with them is to build a model, based on economic theory, answer the question for the model world and then apply the results to economic phenomena outside. Data come in, if at all, only in testing a limited number of the model's consequences. Despite some critical voices, economic methodology too has by and large subscribed to a "theory first" approach to applied economics. Error in Economics systematically develops an alternative to the theory-based orthodoxy. It places the methodical study of evidence at the centre of the scientific enterprise and thus provides a foundation for a methodology of evidence-based economics. But the book does not stop at the truism that claims should be based on the best available evidence. Rather, detailed studies in the areas of measurement, causal inference and policy analysis show what it means for a claim to be evidence-based in the context of a concrete case. The examples discussed concern topics as diverse as consumer price indices, radio spectrum auctions, the transmission mechanism, natural experiments on minimum wages and the evaluation of counterfactuals for policy. Error in Economics is essential reading for economic methodologists, philosophers of science and anyone interested in how claims about socio-economic matters are validated.

"Energy for a Warming World" challenges the commonplace notion that the amount of power which mankind can potentially harness from renewable resources is more than large enough to assuage future demand levels. By examining the renewable issue from an electrical engineering perspective, and exercising due regard for the limited capability of current and future electrical generation and transmission systems, this book attempts to provide more realistic statistics for the levels of power which could be extracted from sustainable resources in the critical time frame of 30 to 40 years. The engineering logic leads inexorably to the importance of taking a global outlook on the switch to renewable power supply and transmission – an outlook which has some surprising and uncomfortable ramifications for mankind. "Energy for a Warming World" provides a new perspective on renewable resources for academics and researchers in environmental or electrical power engineering, as well as to students in related areas.

Does science give us a progressively more accurate and objective account of the world? This book by three leading philosophers of science presents a new defense of scientific realism against skeptical and positivist attacks. While positivists view scientific theories as devices for predicting observable phenomena, realists maintain that theories describe hidden processes which account for observable phenomena. This problem raises the question: What are scientific theories about? Do they refer to an unobservable yet real realm of physical processes? It seems undeniable that the scientific endeavor has in some sense made progress. But is the increasing practical success of the physical sciences good grounds for believing that their theories and techniques lead us nearer to the truth? According to Aronson, Harre, and Way, past failures to answer these questions have been due in large part to the assumption that knowledge is expressed in propositions and organized by the canons of logic. On the assumption that science must meet the world in a correspondence between statements and states of affairs, realism turns out to be difficult to defend. Realism Rescued offers a new direction, relying on the importance of models in scientific work. Theories are not to be thought of as sets of propositions, though they can be expressed propositionally. Rather they are models, chunks of orderings of natural kinds. For the first time, the indispensability of models is turned into a powerful argument for realism, an argument that confronts

the skeptic on his own ground. By drawing on a new technique of knowledge representation developed in Artificial Intelligence, the dynamic type-hierarchy, the authors give a convincing account of the central role of models. Such concepts as verisimilitude, natural kind, natural necessity, and natural law can then be presented far more clearly than ever before.

In this update of the 1996 edition, Harrison (U. of Birmingham, UK) and the other UK contributors to 21 chapters keep pace with developments in relevant fields. Additions include a chapter on clean technologies and industrial ecology; discussion of microbiological contamination and chemical pollution of water; and greater emphasis on local air quality management, spurred by the UK National Air Quality Strategy (1997). Illustrations include color satellite maps of pollutants. First published in 1983 as a reference for professionals, but also useful as a college text. Price is converted from 35 pounds sterling. c. Book News Inc.

During the last two centuries, the way economic science is done has changed radically: it has become a social science based on mathematical models in place of words. This book describes and analyses that change - both historically and philosophically - using a series of case studies to illuminate the nature and the implications of these changes. It is not a technical book; it is written for the intelligent person who wants to understand how economics works from the inside out. This book will be of interest to economists and science studies scholars (historians, sociologists and philosophers of science). But it also aims at a wider readership in the public intellectual sphere, building on the current interest in all things economic and on the recent failure of the so-called economic model, which has shaped our beliefs and the world we live in.

Describes the radical shift in the study of economic science; where arguing with words was replaced by reasoning with mathematical models.

Health and Safety: Risk Management is the clearest and most comprehensive book on risk management available today. This newly revised fifth edition takes into account new developments in legislation, standards and good practice. ISO 45001, the international health and safety management system standard, is given comprehensive treatment, and the latest ISO 9004 and ISO 19011 have also been addressed. The book is divided into four main parts. Part 1.1 begins with a basic introduction to the techniques of health and safety risk management and continues with a description of ISO 45001. Part 1.2 covers basic human factors including how the sense organs work and the psychology of the individual. Part 2.1 deals with more advanced techniques of risk management including advanced incident investigation, audit and risk assessment, and Part 2.2 covers a range of advanced human factors topics including human error and decision making. This authoritative treatment of health and safety risk management is essential reading for both students working towards degrees, diplomas and postgraduate or vocational qualifications, and experienced health and safety professionals, who will find it invaluable as a reference.

Miniaturisation is the creation of small objects that resemble larger ones, usually, but not always, for purposes different to those of the larger original object. Worlds in Miniaturebrings together researchers working across various regions, time periods and disciplines to explore the subject of miniaturisation as a material culture technique. It offers original contribution to the field of miniaturisation through its broad geographical scope, interdisciplinary approach, and deep understanding of miniatures and their

diverse contexts. Beginning with an introduction by the editors, which offers one possible guide to studying and comparing miniatures, the following chapters include studies of miniature Neolithic stone circles on Exmoor, Ancient Egyptian miniature assemblages, miniaturisation under colonialism as practiced by the Makah People of Washington State, miniature surf boats from India, miniaturised contemporary tourist art of the Warao people of Venezuela, and dioramas on display in the Science Museum. Interspersing the chapters are interviews with miniature-makers, including two miniature boat-builders at the National Maritime Museum Cornwall and a freelance architectural model-maker. Professor Susanne Küchler concludes the volume with a theoretical study summarising the current state of miniaturisation as a research discipline. The interdisciplinary nature of the volume makes it suitable reading for anthropologists, archaeologists, historians and artists, and for researchers in related fields across the social sciences.

This book contains a set of notes prepared by Ragnar Frisch for a lecture series that he delivered at Yale University in 1930. The lecture notes provide not only a valuable source document for the history of econometrics, but also a more systematic introduction to some of Frisch's key methodological ideas than his other works so far published in various media for the econometrics community. In particular, these notes contain a number of prescient ideas precursory to some of the most important notions developed in econometrics during the 1970s and 1980s More remarkably, Frisch demonstrated a deep understanding of what econometric or statistical analysis could achieve under the situation where there lacked known correct theoretical models. This volume has been rigorously edited and comes with an introductory essay from Olav Bjerkholt and Duo Qin placing the notes in their historical context.

This book provides students with the skills to develop their own models for application in conservation biology and wildlife management. Assuming no special mathematical expertise, the computational models used are kept simple and show how to develop models in both spreadsheet and programming language format. Develops thought-provoking applications which emphasize the value of modeling as a learning tool Examines basic descriptive equations, matrix representations, consumer-resources interactions, applications in simulation, scenarios, harvesting, population viability, metapopulation dynamics, disease outbreaks, vegetation stage and state dynamics, habitat suitability assessment, and model selection statistics Includes a wide range of examples relating to birds, fish, plants and large African mammals

Consumers, investors, and corporations orient their activities toward a future that contains opportunities and risks. How do these actors assess uncertainty? Jens Beckert adds a new chapter to the theory of capitalism by showing how fictional expectations drive modern economies—or throw them into crisis when imagined futures fail to materialize.

Econometrics is a study of good and bad ways to measure economic relations. In this book, Bernt Stigum considers the role that economic theory ought to play in such measurements and proposes a formal science of economics that provides the means to solve the measurement problems faced by econometric researchers. After describing the salient parts of a formal science of economics, Stigum compares its methods with the methods of contemporary applied econometrics. His goal is to develop a basis for meaningful discussion of the best way to incorporate economic theory in empirical analysis. Stigum conceives two scenarios for research in applied econometrics: contemporary

econometrics in the tradition of Trygve Haavelmo and the formal theory-data confrontation envisioned by Ragnar Frisch. Stigum presents case studies of economic phenomena, contrasting the empirical analysis prescribed by contemporary applied econometrics with the empirical analysis prescribed by a formal theory-data confrontation. He finds significant and provocative differences. Which are we to believe when the statistical analyses of these two methodologies yield very different descriptions of the behavior characteristics of data variables and inferences about social reality? Stigum points to three aspects of contemporary econometric methodology that may benefit from serious discussions: the analysis of positively valued time series, a suspect characteristic of qualitative response models, and the search for linearly cointegrated time series. These three aspects are of as much concern to formal econometrics as they are to contemporary econometrics. The Faith is a video-based study that points you to the heart of the gospel: God searches to reclaim you as his own. This HD video download of Session 6, 'The Great Proposal,' proclaims that Christianity does not seek to impose itself on people, rather it proposes God's grace to them.

Although there has been much progress in developing theories, models and systems in the areas of Natural Language Processing (NLP) and Vision Processing (VP) there has heretofore been little progress on integrating these subareas of Artificial Intelligence (AI). This book contains a set of edited papers addressing computational models and systems for the integration of NLP and VP. The papers focus on site descriptions such as that of the large Japanese $500 million Real World Computing (RWC) project, on historical philosophical issues, on systems which have been built and which integrate the processing of visual scenes together with language about them, and on spatial relations which appear to be the key to integration. The U.S.A., Japan and the EU are well reflected, showing up the fact that integration is a truly international issue. There is no doubt that all of this will be necessary for the InformationSuperHighways of the future.

This book is a simple introduction to the logic behind analyses and sampling design for mark-recapture and survey efforts. With a focus on the early user and beginner, the book explains the complicated formulas and statistics that can be effectively used around the world in support of conservation efforts.

Summarizes and illuminates two decades of research Gathering important papers by both philosophers and scientists, this collection illuminates the central themes that have arisen during the last two decades of work on the conceptual foundations of artificial intelligence and cognitive science. Each volume begins with a comprehensive introduction that places the coverage in a broader perspective and links it with material in the companion volumes. The collection is of interest in many disciplines including computer science, linguistics, biology, information science, psychology, neuroscience, iconography, and philosophy. Examines initial efforts and the latest controversies The topics covered range from the bedrock assumptions of the computational approach to understanding the mind, to the more recent debates concerning cognitive architectures, all the way to the latest developments in robotics, artificial life, and dynamical systems theory. The collection first examines the lineage of major research programs, beginning with the basic idea of machine intelligence itself, then focuses on specific aspects of thought and intelligence, highlighting the much-discussed issue of consciousness, the equally important, but less densely researched issue of emotional response, and the more traditionally philosophical topic of language and meaning. Provides a gamut of perspectives The editors have included several articles that challenge crucial elements of the familiar research program of cognitive science, as well as important writings whose previous circulation has been limited. Within each volume the papers are organized to reflect a variety of research programs and issues. The substantive introductions that accompany each volume further organize the material and provide readers with a working sense of the issues and the connection between articles.

Edited collection examining the ways in which models are used in modern science.

This book discusses how scientific and other types of cognition make use of models, abduction, and explanatory reasoning in order to produce important and innovative changes in theories and concepts. Gathering revised contributions presented at the international conference on Model-Based Reasoning (MBR18), held on October 24–26 2018 in Seville, Spain, the book is divided into three main parts. The first focuses on models, reasoning, and representation. It highlights key theoretical concepts from an applied perspective, and addresses issues concerning information visualization, experimental methods, and design. The second part goes a step further, examining abduction, problem solving, and reasoning. The respective papers assess different types of reasoning, and discuss various concepts of inference and creativity and their relationship with experimental data. In turn, the third part reports on a number of epistemological and technological issues. By analyzing possible contradictions in modern research and describing representative case studies, this part is intended to foster new discussions and stimulate new ideas. All in all, the book provides researchers and graduate students in the fields of applied philosophy, epistemology, cognitive science, and artificial intelligence alike with an authoritative snapshot of the latest theories and applications of model-based reasoning.

The history of what we call finance today does not begin in ancient Mesopotamia, or in Imperial China, or in the counting houses of Renaissance Europe. This timely and magisterial book shows that finance as we know it--the combination of institutions, regulations, and models, as well as the infrastructure that manages money, credit, claims, banking, assets, and liabilities--emerged gradually starting in the late nineteenth century and coalesced only after World War II. Kevin Brine, a financial industry veteran, and Mary Poovey, a historian, lay bare the history of finance in the United States over this critical period. They show how modern finance made itself known in episodes such as the 1907 Bankers' Panic on Wall Street, passage of the Federal Reserve Act in 1913, and the marginalist tax policies adopted by the federal government in the 1920s. Over its long history, the distinctive feature of modern economics has been its reliance on mathematical modeling; Brine and Poovey show how this reliance came about, and how economists themselves understand it. "Finance in America: An Unfinished Story" provides the long view that we need to advance our national conversation about the place of finance. The story is unfinished because the 2009 financial crisis opened a perilous new chapter in this history, with reverberations that are still felt throughout the world. How we arrived at this most recent crisis is impossible to understand without the kind of history that Brine and Poovey provide here.

What has gone wrong with economics? Economists now routinely devise highly sophisticated abstract models that score top marks for theoretical rigour but are clearly divorced from observable activities in the current economy. This creates an 'uneconomic economics', where models explain relationships in blackboard rather than real-life markets.

According to NCTM's Principles and Standards for School mathematics, "Technology is essential in teaching and learning of mathematics; it influences the mathematics that is taught and it enhances students' learning." How does research inform this clarion call for technology in mathematics teaching and learning? In response to the need to craft appropriate roles for technology in school mathematics new technological approaches have been applied to the teaching and learning of mathematics, and these approaches have been examined by researchers world-wide. The first volume provides insight into what research suggests about the nature of mathematics learning in technological environments. Included in this volume are syntheses of research on technology in the learning of rational number, algebra, elementary and secondary geometry, mathematical modeling, and calculus. Additional chapters synthesize research on technology in the practice of teaching and on equity issues in the use of technology in mathematics instruction. Instead of simply reporting achievement scores

of students who use technology in their learning, authors provide thoughtful analyses of bodies of research with the goal of understanding the ways in which technology affects what and how students learn. Each of the chapters in this volume is written by a team of experts whose own research has provided important guidance to the field.

This unique volume introduces and discusses the methods of validating computer simulations in scientific research. The core concepts, strategies, and techniques of validation are explained by an international team of pre-eminent authorities, drawing on expertise from various fields ranging from engineering and the physical sciences to the social sciences and history. The work also offers new and original philosophical perspectives on the validation of simulations. Topics and features: introduces the fundamental concepts and principles related to the validation of computer simulations, and examines philosophical frameworks for thinking about validation; provides an overview of the various strategies and techniques available for validating simulations, as well as the preparatory steps that have to be taken prior to validation; describes commonly used reference points and mathematical frameworks applicable to simulation validation; reviews the legal prescriptions, and the administrative and procedural activities related to simulation validation; presents examples of best practice that demonstrate how methods of validation are applied in various disciplines and with different types of simulation models; covers important practical challenges faced by simulation scientists when applying validation methods and techniques; offers a selection of general philosophical reflections that explore the significance of validation from a broader perspective. This truly interdisciplinary handbook will appeal to a broad audience, from professional scientists spanning all natural and social sciences, to young scholars new to research with computer simulations. Philosophers of science, and methodologists seeking to increase their understanding of simulation validation, will also find much to benefit from in the text.

There is an embarrassing polarization of opinions about the status of economics as an academic discipline, as reflected in epithets such as the Dismal Science and the Queen of the Social Sciences. This collection brings together some of the leading figures in the methodology and philosophy of economics to provide a thoughtful and balanced overview of the current state of debate about the nature and limits of economic knowledge. Authors with partly rival and partly complementary perspectives examine how abstract models work and how they might connect with the real world, they look at the special nature of the facts about the economy, and they direct attention towards the academic institutions themselves and how they shape economic research. These issues are thus analysed from the point of view of methodology, semantics, ontology, rhetoric, sociology, and economics of science.

The goal of behavioural economics is to improve the explanatory and predictive power of economics. This can be achieved by using theoretical and methodological resources of psychology. Its fundamental idea is that the relationship between psychology and economics cannot be subsumed under standard philosophical accounts of intertheoretical relations. Philosophical Problems of Behavioural Economics argues that behavioural economics is best understood as an attempt to deidealize economic theory guided by psychological research. Behavioural economics deconstructs the model of decision-making by adding different elements. Based on this understanding behavioural economics has a number of tasks: first, it has to identify which economic theory needs to be challenged; second it aims to identify factors which need to be modelled within economic theories of choice and modify the theory accordingly; and finally, it has to create models that explain economic phenomena based on the new theory. This book analyses the different stages of this deconstruction process and shows how the scientific disciplines of economics and psychology are connected by it. This volume develops a new account of intertheoretical relations based on the idea of deidealization and thus contributes to debates within the philosophy of social science. It is suitable for those

who are interested in or study economic theory and philosophy, economic psychology and philosophy of social science.

This book contains an edited versIOn of lectures presented at the NATO ADVANCED STUDY INSTITUTE on VIRTUAL NONLINEAR MUL TIBODY SYSTEMS which was held in Prague, Czech Republic, from 23 June to 3 July 2002. It was organized by the Department of Mechanics, Faculty of Mechanical Engineering, Czech Technical University in Prague, in cooperation with the Institute B of Mechanics, University of Stuttgart, Germany. The ADVANCED STUDY INSTITUTE addressed the state of the art in multibody dynamics placing special emphasis on nonlinear systems, virtual reality, and control design as required in mechatronics and its corresponding applications. Eighty-six participants from twenty-two countries representing academia, industry, government and research institutions attended the meeting. The high qualification of the participants contributed greatly to the success of the ADVANCED STUDY INSTITUTE in that it promoted the exchange of experience between leading scientists and young scholars, and encouraged discussions to generate new ideas and to define directions of research and future developments. The full program of the ADVANCED STUDY INSTITUTE included also contributed presentations made by participants where different topics were explored, among them: Such topics include: nonholonomic systems; flexible multibody systems; contact, impact and collision; numerical methods of differential-algebraical equations; simulation approaches; virtual modelling; mechatronic design; control; biomechanics; space structures and vehicle dynamics. These presentations have been reviewed and a selection will be published in this volume, and in special issues of the journals Multibody System Dynamics and Mechanics of Structures and Machines.

The purpose of the 3rd International Conference on Enterprise Information Systems (ICEIS) was to bring together researchers, engineers, and practitioners interested in the advances and business applications of information systems. The research papers published here have been carefully selected from those presented at the conference, and focus on real world applications covering four main themes: database and information systems integration; artificial intelligence and decision support systems; information systems analysis and specification; and internet computing and electronic commerce. Audience: This book will be of interest to information technology professionals, especially those working on systems integration, databases, decision support systems, or electronic commerce. It will also be of use to middle managers who need to work with information systems and require knowledge of current trends in development methods and applications.

OpenGL® SuperBible, Seventh Edition, is the definitive programmer's guide, tutorial, and reference for OpenGL 4.5, the world's leading 3D API for real-time computer graphics. The best introduction for any developer, it clearly explains OpenGL's newest APIs; key extensions; shaders; and essential, related concepts. You'll find up-to-date, hands-on guidance for all facets of modern OpenGL development—both desktop and mobile. The authors explain what OpenGL does, how it connects to the graphics pipeline, and how it manages huge datasets to deliver compelling experiences. Step by step, they present increasingly sophisticated techniques, illuminating key concepts with worked examples. They introduce OpenGL on several popular platforms, and offer up-to-date best practices and performance advice. This revised and updated edition introduces many new OpenGL 4.5 features, including important ARB and KHR extensions that are now part of the standard. It thoroughly covers the latest Approaching Zero Driver Overhead (AZDO) performance features, and demonstrates key enhancements with new example applications. Coverage includes A practical introduction to real-time 3D graphics, including foundational math Core techniques for rendering, transformations, and

texturing Shaders and the OpenGL Shading Language (GLSL) in depth Vertex processing, drawing commands, primitives, fragments, and framebuffers Compute shaders: harnessing graphics cards for more than graphics Pipeline monitoring and control Managing, loading, and arbitrating access to data Building larger applications and deploying them across platforms Advanced rendering: light simulation, artistic and non-photorealistic effects, and more Reducing CPU overhead and analyzing GPU behavior Supercharging performance with persistent maps, bindless textures, and fine-grained synchronization Preventing and debugging errors New applications: texture compression, text drawing, font rendering with distance fields, high-quality texture filtering, and OpenMP Bonus material and sample code are available at openglsuperbible.com.

The Routledge Companion to Philosophy of Social Science is an outstanding guide to the major themes, movements, debates, and topics in the philosophy of social science. It includes thirty-seven newly written chapters, by many of the leading scholars in the field, as well as a comprehensive introduction by the editors. Insofar as possible, the material in this volume is presented in accessible language, with an eye toward undergraduate and graduate students who may be coming to some of this material for the first time. Scholars too will appreciate this clarity, along with the chance to read about the latest advances in the discipline. The Routledge Companion to Philosophy of Social Science is broken up into four parts. Historical and Philosophical Context Concepts Debates Individual Sciences Edited by two of the leading scholars in the discipline, this volume is essential reading for anyone interested in the philosophy of social science, and its many areas of connection and overlap with key debates in the philosophy of science.

This book proposes a novel position in the debate on scientific realism: Modal Empiricism. Modal empiricism is the view that the aim of science is to provide theories that correctly delimit, in a unified way, the range of experiences that are naturally possible given our position in the world. The view is associated with a pragmatic account of scientific representation and an original notion of situated modalities, together with an inductive epistemology for modalities. It purports to provide a faithful account of scientific practice and of its impressive achievements, and defuses the main motivations for scientific realism. More generally, Modal Empiricism purports to be the precise articulation of a pragmatist stance towards science. This book is of interest to any philosopher involved in the debate on scientific realism, or interested in how to properly understand the content, aim and achievements of science.

This is a book about one of the most controversial concepts in economics the invisible hand. The author explores the unintended social consequences implied by the invisible hand and discusses the mechanisms that bring about these consequences. The book questions, examines and explicates the strengths and weaknesses of invisible hand explanations concerning the emergence of institutions and macro-social structures, from a methodological and

philosophical perspective. Aydinonat analyses paradigmatic examples of invisible-hand explanations, such as Carl Menger's `Origin of Money' and Thomas Schelling's famous chequerboard model of residential segregation in relation to contemporary models of emergence of money and segregation.Based on this analysis, he provides a fresh look at the philosophical literature on models and explanation and develops a philosophical framework for interpreting invisible hand type of explanations in economics and elsewhere. Finally, the author applies this framework to recent game theoretic models of institutions and outlines the way in which they should be evaluated. Covering areas such as history, philosophy of economics and game theory this book will appeal to philosophers of social science and historians of economic thought, as well as to practising economists.

This book integrates multiple criteria concepts and methods for problems within the Risk, Reliability and Maintenance (RRM) context. The concepts and foundations related to RRM are considered for this integration with multicriteria approaches. In the book, a general framework for building decision models is presented and this is illustrated in various chapters by discussing many different decision models related to the RRM context. The scope of the book is related to ways of how to integrate Applied Probability and Decision Making. In Applied Probability, this mainly includes: decision analysis and reliability theory, amongst other topics closely related to risk analysis and maintenance. In Decision Making, it includes a broad range of topics in MCDM (Multi-Criteria Decision Making) and MCDA (Multi-Criteria Decision Aiding; also known as Multi-Criteria Decision Analysis). In addition to decision analysis, some of the topics related to Mathematical Programming area are briefly considered, such as multiobjective optimization, since methods related to these topics have been applied to the context of RRM. The book addresses an innovative treatment for the decision making in RRM, thereby improving the integration of fundamental concepts from the areas of both RRM and decision making. This is accomplished by presenting an overview of the literature on decision making in RRM. Some pitfalls of decision models when applying them to RRM in practice are discussed and guidance on overcoming these drawbacks is offered. The procedure enables multicriteria models to be built for the RRM context, including guidance on choosing an appropriate multicriteria method for a particular problem faced in the RRM context. The book also includes many research advances in these topics. Most of the multicriteria decision models that are described are specific applications that have been influenced by this research and the advances in this field. Multicriteria and Multiobjective Models for Risk, Reliability and Maintenance Decision Analysis is implicitly structured in three parts, with 12 chapters. The first part deals with MCDM/A concepts methods and decision processes. The second part presents the main concepts and foundations of RRM. Finally the third part deals with specific decision problems in the RRM context approached with MCDM/A models.