

The Conceptual Foundations Of The Statistical Approach In Mechanics Tatiana Ehrenfest

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The conceptual Foundations of the statistical approach in mechanics - Paul Ehrenfest 1959

Physical Theory - Lawrence Sklar 2014-09-30
In nine new essays, distinguished philosophers of science take on outstanding philosophical issues that arise in the exploration of the foundations of contemporary, especially physical scientific theories. In the first part of the book issues of scientific method are explored. What are we asking when we pose scientific "why?" questions? How does probability play a role in answering such questions? What are scientific laws of nature? How can we understand what abstract theories are telling us about the world? What is the structure of the theories we use to explain the observable phenomena? Finally, how do theories evolve over time and what consequence do such changes have for our intuition that science is seeking the truth? In the second part of the volume, foundational issues are explored in a number of crucial physical theories. What do our best available theories tell us about space and time? When we apply quantum theory to fields or other systems with

infinite degrees of freedom, what new foundational puzzles appear and how might a theory of interpretation deal with them? Finally, what are the crucial foundational issues in statistical mechanics, where probabilities are applied to explain macroscopic thermal phenomena?

Randomness and Recurrence in Dynamical Systems: A Real Analysis Approach - Rodney Nilsen 2010-12-31

Randomness and Recurrence in Dynamical Systems aims to bridge a gap between undergraduate teaching and the research level in mathematical analysis. It makes ideas on averaging, randomness, and recurrence, which traditionally require measure theory, accessible at the undergraduate and lower graduate level. The author develops new techniques of proof and adapts known proofs to make the material accessible to students with only a background in elementary real analysis. Over 60 figures are used to explain proofs, provide alternative viewpoints and elaborate on the main text. The book explains further developments in terms of measure theory. The results are presented in the context of dynamical systems, and the

quantitative results are related to the underlying qualitative phenomena—chaos, randomness, recurrence and order. The final part of the book introduces and motivates measure theory and the notion of a measurable set, and describes the relationship of Birkhoff's Individual Ergodic Theorem to the preceding ideas. Developments in other dynamical systems are indicated, in particular Lévy's result on the frequency of occurrence of a given digit in the partial fractions expansion of a number.

Physics Of Reality, The: Space, Time, Matter, Cosmos - Proceedings Of The 8th Symposium Honoring Mathematical Physicist Jean-pierre Vigier - Richard L Amoroso 2013-09-18

A truly Galilean-class volume, this book introduces a new method in theory formation, completing the tools of epistemology. It covers a broad spectrum of theoretical and mathematical physics by researchers from over 20 nations from four continents. Like Vigier himself, the Vigier symposia are noted for addressing avant-garde, cutting-edge topics in contemporary physics. Among the six proceedings honoring J.-P. Vigier, this is perhaps the most exciting one as several important breakthroughs are introduced for the first time. The most interesting breakthrough in view of the recent NIST experimental violations of QED is a continuation of the pioneering work by Vigier on tight bound states in hydrogen. The new experimental protocol described not only promises empirical proof of large-scale extra dimensions in conjunction with avenues for testing string theory, but also implies the birth of the field of unified field mechanics, ushering in a new age of discovery. Work on quantum computing redefines the qubit in a manner that the uncertainty principle may be routinely violated. Other breakthroughs occur in the utility of quaternion algebra in extending our understanding of the nature of the fermionic singularity or point particle. There are several other discoveries of equal magnitude, making this volume a must-have acquisition for the library of any serious forward-looking researchers.

The Logic of Thermostatistical Physics - Gerard G. Emch 2013-04-17

This book is devoted to a thorough analysis of

the role that models play in the practise of physical theory. The authors, a mathematical physicist and a philosopher of science, appeal to the logicians' notion of model theory as well as to the concepts of physicists.

Mathematical and Conceptual Foundations of 20th-Century Physics - G.G. Emch

2000-04-01

This book is primarily intended for Mathematicians, but students in the physical sciences will find here information not usually available in physics texts. The main aim of this book is to provide a unified mathematical account of the conceptual foundations of 20th-Century Physics, in a form suitable for a one-year survey course in Mathematics or Mathematical Physics. Emphasis is laid on the interlocked historical development of mathematical and physical ideas.

The Concept of Probability in Statistical Physics - Y. M. Guttman 1999-07-13

A most systematic study of how to interpret probabilistic assertions in the context of statistical mechanics.

The Elgar Companion to Economics and Philosophy - John Bryan Davis 2005-01-01

. . . there are many first-rate contributions here. Those contributions make this collection valuable especially to readers who are already knowledgeable about the various areas in which the interests of philosophers and economists overlap. Daniel M. Hausman, *Journal of Economic Methodology* The Elgar Companion To Economics and Philosophy is a very good read. Every library should buy it now. John King, *History of Economics Review* The volume collects articles surveying developments in such related fields as economic methodology, ethics, epistemology, and social ontology. Many of the articles are forward-looking, and as such constitute substantive and original (and at times provocative) contributions to the literature. The volume as a whole is a success; the editors are to be congratulated for their efforts. Bruce J. Caldwell, University of North Carolina, Greensboro, US This Companion is called economics and philosophy but actually it is about the philosophy of economics and all the great questions in the subject are here. The weather in the philosophy of economics has been stormy lately and the climate continues to this

day to be unsettled. Will the storms soon settle down to give way to calmer days? Read this excellent collection of informative papers in the field to stimulate your own answer to that question. Mark Blaug, University of London and University of Buckingham, UK The Elgar Companion to Economics and Philosophy aims to demonstrate exactly how these two important areas have always been linked, and to illustrate the key areas of overlap. The Companion is divided into distinct parts, each of which highlights a leading area of scholarly concern: political economy conceived as social philosophy; the methodology and epistemology of economics; and social ontology and the ontology of economics. The contributors are well-known and distinguished authors from a variety of disciplines, who have been invited both to survey and to provide a personal assessment of current and prospective future states of their respective areas of philosophical interest. Academics and students who have an interest in economics and philosophy, political philosophy and the history of ideas will find this book of great appeal, as will researchers working in the field and readers interested in the nature of the discipline of economics.

Two Essays on Entropy - Rudolf Carnap
2021-01-08

This title is part of UC Press's Voices Revived program, which commemorates University of California Press's mission to seek out and cultivate the brightest minds and give them voice, reach, and impact. Drawing on a backlist dating to 1893, Voices Revived makes high-quality, peer-reviewed scholarship accessible once again using print-on-demand technology. This title was originally published in 1977.

Protobiology Physical Basis Of Biology - K. Matsuno
2018-10-24

Protobiology as a physics of becoming emphasizes the dynamics underlying conservation laws, whereas the physics of being emphasize the dynamics presupposing conservation laws. Protobiology thus concerns itself with a convoluted problem of how both the law of motion and its boundary conditions develop with time without forgetting that these two are inseparable, in contrasts to the physics of being that assumes separability.

Philosophy of Physics - Jeremy Butterfield

2007

The ambition of this volume is twofold: to provide a comprehensive overview of the field and to serve as an indispensable reference work for anyone who wants to work in it. For example, any philosopher who hopes to make a contribution to the topic of the classical-quantum correspondence will have to begin by consulting Klaas Landsman's chapter. The organization of this volume, as well as the choice of topics, is based on the conviction that the important problems in the philosophy of physics arise from studying the foundations of the fundamental theories of physics. It follows that there is no sharp line to be drawn between philosophy of physics and physics itself. Some of the best work in the philosophy of physics is being done by physicists, as witnessed by the fact that several of the contributors to the volume are theoretical physicists: viz., Ellis, Emch, Harvey, Landsman, Rovelli, 't Hooft, the last of whom is a Nobel laureate. Key features - Definitive discussions of the philosophical implications of modern physics - Masterly expositions of the fundamental theories of modern physics - Covers all three main pillars of modern physics: relativity theory, quantum theory, and thermal physics - Covers the new sciences grown from these theories: for example, cosmology from relativity theory; and quantum information and quantum computing, from quantum theory - Contains special Chapters that address crucial topics that arise in several different theories, such as symmetry and determinism - Written by very distinguished theoretical physicists, including a Nobel Laureate, as well as by philosophers - Definitive discussions of the philosophical implications of modern physics - Masterly expositions of the fundamental theories of modern physics - Covers all three main pillars of modern physics: relativity theory, quantum theory, and thermal physics - Covers the new sciences that have grown from these theories: for example, cosmology from relativity theory; and quantum information and quantum computing, from quantum theory - Contains special Chapters that address crucial topics that arise in several different theories, such as symmetry and determinism - Written by very distinguished theoretical physicists, including a Nobel

Laureate, as well as by philosophers

Rethinking the Concept of Law of Nature -

Yemima Ben-Menahem 2022-06-13

This book subjects the traditional concept of law of nature to critical examination. There are two kinds of reasons that invite this reexamination, one deriving from philosophical concerns over the traditional concept, the other motivated by theoretical and practical changes in science. One of the philosophical worries is that the idiom of law of nature, especially when combined with the notion of laws 'governing' individual events and processes, is no longer as intelligible as it used to be in the theistic context in which the formulation of laws became central to science. The traditional concept is also challenged in various ways by contemporary scientific theories such as quantum mechanics, chaos theory and the general theory of relativity. It is no longer clear that there are any universal laws, laws do not always guarantee predictability, and the border between physical and mathematical considerations is constantly shifting. The most difficult challenge, perhaps, is to come up with a scientific explanation of the origin of laws. Wrestling with these intriguing problems, the papers in this volume broaden both our understanding of the natural order and our desiderata of scientific explanation.

Entropy, Large Deviations, and Statistical Mechanics - Richard S. Ellis 2007-02-03

From the reviews: "... Each chapter of the book is followed by a notes section and by a problems section. There are over 100 problems, many of which have hints. The book may be recommended as a text, it provides a completely self-contained reading ..." --S. Pogossian in Zentralblatt für Mathematik

Modern Group Theoretical Methods in Physics - J. Bertrand 2013-06-29

This book contains the proceedings of a meeting that brought together friends and colleagues of Guy Rideau at the Université Denis Diderot (Paris, France) in January 1995. It contains original results as well as review papers covering important domains of mathematical physics, such as modern statistical mechanics, field theory, and quantum groups. The emphasis is on geometrical approaches. Several papers are devoted to the study of symmetry groups, including applications to nonlinear differential

equations, and deformation of structures, in particular deformation-quantization and quantum groups. The richness of the field of mathematical physics is demonstrated with topics ranging from pure mathematics to up-to-date applications such as imaging and neuronal models. Audience: Researchers in mathematical physics.

Probability in Physics - Yemima Ben-Menahem 2012-01-25

What is the role and meaning of probability in physical theory, in particular in two of the most successful theories of our age, quantum physics and statistical mechanics? Laws once conceived as universal and deterministic, such as Newton's laws of motion, or the second law of thermodynamics, are replaced in these theories by inherently probabilistic laws. This collection of essays by some of the world's foremost experts presents an in-depth analysis of the meaning of probability in contemporary physics. Among the questions addressed are: How are probabilities defined? Are they objective or subjective? What is their explanatory value? What are the differences between quantum and classical probabilities? The result is an informative and thought-provoking book for the scientifically inquisitive.

Controversy Spaces - Oscar Nudler 2011

The notion of controversy space is the key element of the new model of scientific and philosophical change introduced in this book. Devised as an alternative to classical models, the model of Controversy Spaces is a heuristic tool for the reconstruction of processes of conceptual change in the history of science and philosophy. The first chapter of this volume outlines in its initial section the historical trajectory of the dialectical, adversarial approach to the progress of knowledge, from its ancient flourishing and its almost complete oblivion in modernity up to its contemporary revival. Then the main features that characterize the structure and dynamics of controversy spaces are identified and examined. In the rest of the book the reader will find a detailed, fascinating series of case studies that apply the CS model in a variety of scientific areas, ranging from physics to linguistics, as well as the philosophy of mind and the philosophy of historiography.

The Legacy of Tatjana Afanassjewa - Jos

Uffink 2020-11-28

This book presents a collection of essays that explore the life and works of Tatjana Afanassjewa (1876–1964), a Russian–Dutch physicist–mathematician. Readers will discover a scientist whose work on the foundations of thermodynamics significantly influenced the field itself as well as the philosophy of physics. This book highlights the philosophical consequences of her work in physics and mathematics and discusses historical aspects of her writings on the foundations of physics. In addition, it features English translations and critical reviews of key selections from her texts. First and foremost, the book highlights the numerous contributions that Afanassjewa made to the field. In particular, the authors examine her work on the foundations of thermodynamics and statistical physics, starting in the 1920s and extending to 1956, well after the untimely death of her husband in 1933. They also explore her almost entirely forgotten work on the didactics of mathematics. In addition, they discuss her influential collaboration with her husband, the Austrian physicist Paul Ehrenfest (1880–1933). The portrait that emerges is that of a highly original physicist and mathematician, whose legacy continues to influence scientists and philosophers today and whose lesser-known works deserve more attention than they have received. Readers will find a rich body of work that continues to this day to yield insights into the foundations of physics and mathematics.

Mathematical Techniques and Physical Applications - J Killingbeck 2012-12-02

Mathematical Techniques and Physical Applications provides a wide range of basic mathematical concepts and methods, which are relevant to physical theory. This book is divided into 10 chapters that cover the different branches of traditional mathematics. This book deals first with the concept of vector, matrix, and tensor analysis. These topics are followed by discussions on several theories of series relevant to physics; the fundamentals of complex variables and analytic functions; variational calculus for presenting the basic laws of many branches of physics; and the applications of group representations. The final chapters explore some partial and integral equations and derivatives of physics, as well as the concept and

application of probability theory. Physics teachers and students will greatly appreciate this book.

Using History to Teach Mathematics - Victor J. Katz 2000-09-21

This volume examines how the history of mathematics can find application in the teaching of mathematics itself.

Method, Model and Matter - M. Bunge 2012-12-06

This collection of essays deals with three clusters of problems in the philosophy of science: scientific method, conceptual models, and ontological underpinnings. The disjointedness of topics is more apparent than real, since the whole book is concerned with the scientific knowledge of fact. Now, the aim of factual knowledge is the conceptual grasping of being, and this understanding is provided by theories of whatever there may be. If the theories are testable and specific, such as a theory of a particular chemical reaction, then they are often called 'theoretical models' and clas sed as scientific. If the theories are extremely general, like a theory of syn thesis and dissociation without any reference to a particular kind of stuff, then they may be called 'metaphysical' - as well as 'scientific' if they are consonant with science. Between these two extremes there is a whole gamut of kinds of factual theories. Thus the entire spectrum should be dominated by the scientific method, quite irrespective of the subject matter. This is the leitmotiv of the present book. The introductory chapter, on method in the philosophy of science, tackles the question 'Why don't scientists listen to their philosophers?'. Equilibrium and Non-Equilibrium Statistical Mechanics - Carolyn M Van Vliet 2008-06-11 This book encompasses our current understanding of the ensemble approach to many-body physics, phase transitions and other thermal phenomena, as well as the quantum foundations of linear response theory, kinetic equations and stochastic processes. It is destined to be a standard text for graduate students, but it will also serve the specialist-researcher in this fascinating field; some more elementary topics have been included in order to make the book self-contained. The historical methods of J Willard Gibbs and Ludwig

Boltzmann, applied to the quantum description rather than phase space, are featured. The tools for computations in the microcanonical, canonical and grand-canonical ensembles are carefully developed and then applied to a variety of classical and standard quantum situations. After the language of second quantization has been introduced, strongly interacting systems, such as quantum liquids, superfluids and superconductivity, are treated in detail. For the connoisseur, there is a section on diagrammatic methods and applications. In the second part dealing with non-equilibrium processes, the emphasis is on the quantum foundations of Markovian behaviour and irreversibility via the Pauli-Van Hove master equation. Justifiable linear response expressions and the quantum-Boltzmann approach are discussed and applied to various condensed matter problems. From this basis the Onsager-Casimir relations are derived, together with the mesoscopic master equation, the Langevin equation and the Fokker-Planck truncation procedure. Brownian motion and modern stochastic problems such as fluctuations in optical signals and radiation fields briefly make the round.

The Ashgate Companion to Contemporary Philosophy of Physics - Dean Rickles

2016-11-25

Introducing the reader to the very latest developments in the philosophical foundations of physics, this book covers advanced material at a level suitable for beginner and intermediate students. A detailed overview is provided of the central debates in the philosophy of quantum mechanics, statistical mechanics, quantum computation, and quantum gravity. Each chapter consists of a 'state of the art' review written by a specialist in the field and introduces the reader to the relevant formal aspects along with the philosophical implications. These, and the various interpretive options, are developed in a self-contained, clear, and concise manner. Special care is given to situating the reader within the contemporary debates by providing numerous references and readings. This book thus enables both philosophers and physicists to engage with the most pressing problems in contemporary philosophy of physics in a fruitful way.

The Road to Maxwell's Demon - Meir Hemmo

2012-09-20

A philosophical perspective to statistical mechanics for graduate students and researchers in the foundations and philosophy of physics.

The Philosophy of Quantitative Methods -

Brian D. Haig 2018-01-04

The Philosophy of Quantitative Methods focuses on the conceptual foundations of research methods within the behavioral sciences. In particular, it undertakes a close philosophical examination of a variety of quantitative research methods that are prominent in (or relevant for) the conduct of research in these fields. By doing so, the deep structure of these methods is examined in order to overcome the non-critical approaches typically found in the existing literature today. In this book, Brian D. Haig focuses on the more well-known research methods such as exploratory data analysis, statistical significant testing, Bayesian confirmation theory and statistics, meta-analysis, and exploratory factor analysis. These methods are then examined with a philosophy consistent of scientific realism. In addition, each chapter provides a helpful Further Reading section in order to better assist the reader in extending their own thinking and research methods specific to their needs.

Quantum Theory - Peter Bongaarts 2014-12-01

This book was inspired by the general observation that the great theories of modern physics are based on simple and transparent underlying mathematical structures - a fact not usually emphasized in standard physics textbooks - which makes it easy for mathematicians to understand their basic features. It is a textbook on quantum theory intended for advanced undergraduate or graduate students: mathematics students interested in modern physics, and physics students who are interested in the mathematical background of physics and are dissatisfied with the level of rigor in standard physics courses. More generally, it offers a valuable resource for all mathematicians interested in modern physics, and all physicists looking for a higher degree of mathematical precision with regard to the basic concepts in their field.

Mathematical Foundations of Quantum Statistics

- Aleksandr Iakovlevich Khinchin 1998-01-01

A coherent, well-organized look at the basis of quantum statistics' computational methods, the determination of the mean values of occupation numbers, the foundations of the statistics of photons and material particles, thermodynamics.

Probabilities, Causes and Propensities in Physics - Mauricio Suárez 2010-12-06

This volume defends a novel approach to the philosophy of physics: it is the first book devoted to a comparative study of probability, causality, and propensity, and their various interrelations, within the context of contemporary physics -- particularly quantum and statistical physics. The philosophical debates and distinctions are firmly grounded upon examples from actual physics, thus exemplifying a robustly empiricist approach. The essays, by both prominent scholars in the field and promising young researchers, constitute a pioneer effort in bringing out the connections between probabilistic, causal and dispositional aspects of the quantum domain. The book will appeal to specialists in philosophy and foundations of physics, philosophy of science in general, metaphysics, ontology of physics theories, and philosophy of probability.

Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences - Ivor Grattan-Guinness 2004-11-11

First published in 2004. Routledge is an imprint of Taylor & Francis, an informa company.

Ten Great Ideas about Chance - Persi Diaconis 2019-10-08

In the sixteenth and seventeenth centuries, gamblers and mathematicians transformed the idea of chance from a mystery into the discipline of probability, setting the stage for a series of breakthroughs that enabled or transformed innumerable fields, from gambling, mathematics, statistics, economics, and finance to physics and computer science. This book tells the story of ten great ideas about chance and the thinkers who developed them, tracing the philosophical implications of these ideas as well as their mathematical impact.

Evolution and Emergence - William R. Stoeger 2007-04-05

A collection of essays by experts in the field, exploring how nature works at every level to produce more complex and highly organized objects, systems, and organisms from much

simpler components, and how our increasing understanding of this universal phenomenon of emergence can lead us to a deeper and richer appreciation of who we are as human beings and of our relationship to God. Several chapters introduce the key philosophical ideas about reductionism and emergence, while others explore the fascinating world of emergent phenomena in physics, biology, and the neurosciences. Finally there are contributions probing the meaning and significance of these findings for our general description of the world and ourselves in relation to God, from philosophy and theology. The collection as a whole will extend the mutual creative interaction among the sciences, philosophy, and theology.

Philosophy Of Physics - Lawrence Sklar 2018-03-05

This book focuses on the most important questions of philosophy of physics, offering a sufficiently concise and clear treatment of the issues to lead the interested reader through the sometimes labyrinthian paths taken by the central debates.

Concepts and Recent Advances in Generalized Information Measures and Statistics - Andres M. Kowalski, Raul D. Rossignoli and Evaldo M. F. Curado 2013-12-13

Since the introduction of the information measure widely known as Shannon entropy, quantifiers based on information theory and concepts such as entropic forms and statistical complexities have proven to be useful in diverse scientific research fields. This book contains introductory tutorials suitable for the general reader, together with chapters dedicated to the basic concepts of the most frequently employed information measures or quantifiers and their recent applications to different areas, including physics, biology, medicine, economics, communication and social sciences. As these quantifiers are powerful tools for the study of general time and data series independently of their sources, this book will be useful to all those doing research connected with information analysis. The tutorials in this volume are written at a broadly accessible level and readers will have the opportunity to acquire the knowledge necessary to use the information theory tools in their field of interest.

Asymmetry: The Foundation of Information -

Scott J. Muller 2007-05-11

This book gathers concepts of information across diverse fields - physics, electrical engineering and computational science - surveying current theories, discussing underlying notions of symmetry, and showing how the capacity of a system to distinguish itself relates to information. The author develops a formal methodology using group theory, leading to the application of Burnside's Lemma to count distinguishable states. This provides a tool to quantify complexity and information capacity in any physical system.

Causation in Decision, Belief Change, and Statistics - W.L. Harper 2012-12-06

The papers collected here are, with three exceptions, those presented at a conference on probability and causation held at the University of California at Irvine on July 15-19, 1985. The exceptions are that David Freedman and Abner Shimony were not able to contribute the papers that they presented to this volume, and that Clark Glymour who was not able to attend the conference did contribute a paper. We would like to thank the National Science Foundation and the School of Humanities of the University of California at Irvine for generous support. WILLIAM HARPER University of Western Ontario BRIAN SKYRMS University of California at Irvine VII INTRODUCTION PART I: DECISIONS AND GAMES Causal notions have recently come to figure prominently in discussions about rational decision making. Indeed, a relatively influential new approach to theorizing about rational choice has come to be called "causal decision theory". 1 Decision problems such as Newcombe's Problem and some versions of the Prisoner's Dilemma where an act counts as evidence for a desired state even though the agent knows his choice of that act cannot causally influence whether or not the state obtains have motivated causal decision theorists.

Three Concepts of Time - K. G. Denbigh 2012-12-06

The existence of so many strangely puzzling, even contradictory, aspects of 'time' is due, I think, to the fact that we obtain our ideas about temporal succession from more than one source - from inner experience, on the one side, and from the physical world on the other. 'Time' is

thus a composite notion and as soon as we distinguish clearly between the ideas deriving from the different sources it becomes apparent that there is not just one time-concept but several. Perhaps they should be called variants, but in any case they need to be seen as distinct. In this book I shall aim at characterising what I believe to be the three most basic of them. These form a sort of hierarchy of increasing richness, but diminishing symmetry. Any adequate inquiry into 'time' is necessarily partly scientific and partly philosophical. This creates a difficulty since what may be elementary reading to scientists may not be so to philosophers, and vice versa. For this reason I have sought to present the book at a level which is less 'advanced' than that of a specialist monograph. Due to my own background there is an inevitable bias towards the scientific aspects of time. Certainly the issues I have taken up are very different from those discussed in several recent books on the subject by philosophers.

Approaches to Entropy - Jeremy R. H. Tame 2018-08-30

This is a book about thermodynamics, not history, but it adopts a semi-historical approach in order to highlight different approaches to entropy. The book does not follow a rigid temporal order of events, nor it is meant to be comprehensive. It includes solved examples for a solid understanding. The division into chapters under the names of key players in the development of the field is not intended to separate these individual contributions entirely, but to highlight their different approaches to entropy. This structure helps to provide a different view-point from other text-books on entropy.

The Conceptual Foundations of the Statistical Approach in Mechanics - Paul Ehrenfest 2014-11-12

Classic 1912 article reformulated the foundations of the statistical approach in mechanics. Largely still valid, the treatment covers older formulation of statistico-mechanical investigations, modern formulation of kinetic statistics of the gas model, and more. 1959 edition.

Model Reduction and Coarse-Graining Approaches for Multiscale Phenomena - Alexander N. Gorbunov 2006-09-22

Model reduction and coarse-graining are important in many areas of science and engineering. How does a system with many degrees of freedom become one with fewer? How can a reversible micro-description be adapted to the dissipative macroscopic model? These crucial questions, as well as many other related problems, are discussed in this book. All contributions are by experts whose specialities span a wide range of fields within science and engineering.

Rudolf Carnap, Logical Empiricist - Jaakko Hintikka 2014-11-14

Error and the Growth of Experimental Knowledge - Deborah G. Mayo 1996-08-15
Preface1: Learning from Error 2: Ducks,

Rabbits, and Normal Science: Recasting the Kuhn's-Eye View of Popper 3: The New Experimentalism and the Bayesian Way 4: Duhem, Kuhn, and Bayes 5: Models of Experimental Inquiry 6: Severe Tests and Methodological Underdetermination7: The Experimental Basis from Which to Test Hypotheses: Brownian Motion8: Severe Tests and Novel Evidence 9: Hunting and Snooping: Understanding the Neyman-Pearson Predesignationist Stance10: Why You Cannot Be Just a Little Bit Bayesian 11: Why Pearson Rejected the Neyman-Pearson (Behavioristic) Philosophy and a Note on Objectivity in Statistics12: Error Statistics and Peircean Error Correction 13: Toward an Error-Statistical Philosophy of Science ReferencesIndex
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