

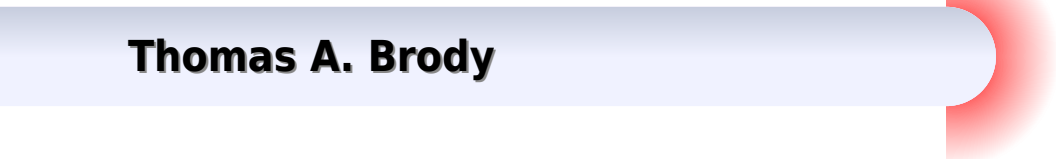
Structure and Approximation in Physical Theories

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Structure Approximation In Physical Theories

Thomas A. Brody



Structure Approximation In Physical Theories:

Structure and Approximation in Physical Theories A. Hartkamper, 2013-11-11 The present volume contains 14 contributions presented at a colloquium on Structure and Approximation in Physical Theories held at Osnabruck in June 1980. The articles are presented in the revised form written after the colloquium and hence also take account of the results of the discussion at the colloquium. It is a striking feature that the problem of approximation in physical theories has only recently found some attention in the philosophy of science although the working physicist is constantly confronted with those questions. No interesting theory of exact science exactly fits its experimental data. Almost every relation between different theories is an approximate one. Therefore an adequate reconstruction of physical theories must take into account and conceptualize the moment of approximation. The majority of the articles in this book is centered around this subject. There are at least two elaborate structuralistic approaches to the formalization of physical theories in which the aspect of approximation has been incorporated: the approach due to P. Suppes, J. Sneed, W. Stegmüller, S. approach and the approach of G. Ludwig and his co-workers, L. approach. The articles in this book correspondingly fall into three classes: presentation, elaboration and critique of the L. approach (Hartkamper, Schmidt, Ludwig, Neumann, Werner, Schmidt, Mayr, Kamiah, Majer, Grafe) or of the S. approach (Moulines, Balzer, Cooke) and articles referring to both approaches or concerned with related matters (Scheibe, Pfarr, Castiglione). Of course this is only a rough classification and each article must be appraised in its own right.

A New Foundation of Physical Theories Günther Ludwig, Gerald Thurler, 2007-12-11 Written in the tradition of G. Ludwig's groundbreaking works, this book aims to clarify and formulate more precisely the fundamental ideas of physical theories. By introducing a basic descriptive language of simple form in which it is possible to formulate recorded facts, ambiguities of physical theories are avoided as much as possible. In this approach, the field of physics that should be described by a theory is determined by basic concepts only, i.e. concepts that can be explained without a theory. In this context, the authors introduce a new concept of idealization and review the process of discovering new concepts. They believe that when the theories are formulated within an axiomatic basis, solutions can be found to many difficult problems such as the interpretation of physical theories, the relations between theories as well as the introduction of physical concepts. The book addresses both physicists and philosophers of science and should encourage the reader to contribute to the understanding of the lasting core of physical knowledge about the real structures of the world.

The Reduction of Physical Theories Erhard Scheibe, 2022-06-30 Using simple physical examples, this work by Erhard Scheibe presents an important and powerful approach to the reduction of physical theories. Novel to the approach is that it is not based as usual on a single reduction concept that is fixed once and for all, but on a series of recursively constructed reductions with which all reductions appear as combinations of very specific elementary reductions. This leaves the general notion of theory reduction initially open and is beneficial for the treatment of the difficult cases of reduction from the fields of special and general relativity, thermodynamics

statistical mechanics and quantum mechanics which are treated in the second volume The book is systematically organized and intended for readers interested in philosophy of science as well as physicists without deep philosophical knowledge

The Theory of Info-Statics: Conceptual Foundations of Information and Knowledge Kofi K. Dompere, 2017-07-06 This book discusses the development of a theory of info statics as a sub theory of the general theory of information It describes the factors required to establish a definition of the concept of information that fixes the applicable boundaries of the phenomenon of information its linguistic structure and scientific applications The book establishes the definitional foundations of information and how the concepts of uncertainty data fact evidence and evidential things are sequential derivatives of information as the primary category which is a property of matter and energy The sub definitions are extended to include the concepts of possibility probability expectation anticipation surprise discounting forecasting prediction and the nature of past present future information structures It shows that the factors required to define the concept of information are those that allow differences and similarities to be established among universal objects over the ontological and epistemological spaces in terms of varieties and identities These factors are characteristic and signal dispositions on the basis of which general definitional foundations are developed to construct the general information definition GID The book then demonstrates that this definition is applicable to all types of information over the ontological and epistemological spaces It also defines the concepts of uncertainty data fact evidence and knowledge based on the GID Lastly it uses set theoretic analytics to enhance the definitional foundations and shows the value of the theory of info statics to establish varieties and categorial varieties at every point of time and thus initializes the construct of the theory of info dynamics

A General Theory of Entropy Kofi Kissi Dompere, 2019-08-02 This book presents an epistemic framework for dealing with information knowledge and certainty uncertainty problems within the space of quality quantity dualities It bridges between theoretical concepts of entropy and entropy measurements proposing the concept and measurement of fuzzy stochastic entropy that is applicable to all areas of knowing under human cognitive limitations over the epistemological space The book builds on two previous monographs by the same author concerning theories of info statics and info dynamics to deal with identification and transformation problems respectively The theoretical framework is developed by using the toolboxes such as those of the principle of opposites systems of actual potential polarities and negative positive dualities under different cost benefit time structures The category theory and the fuzzy paradigm of thought under methodological constructionism reductionism duality are used in the fuzzy stochastic and cost benefit spaces to point to directions of global application in knowing knowledge and decision choice actions Thus the book is concerned with a general theory of entropy showing how the fuzzy paradigm of thought is developed to deal with the problems of qualitative quantitative uncertainties over the fuzzy stochastic space which will be applicable to conditions of soft hard data fact evidence and knowledge over the spaces of problem solution dualities decision choice actions in sciences non sciences engineering and planning sciences to abstract acceptable

information knowledge elements The Philosophy Behind Physics Thomas A. Brody, 2012-12-06 Thomas Brody had one of the most powerful and wide ranging intellects of his generation Although primarily a physicist who worked on statistical problems in nuclear physics on probability theory and on computational physics he had an extensive knowledge of the philosophy of science and of philosophy and was fluent in many languages He is well known among physicists for the Brody Moshinsky transformation but his extensive work on probability and on the philosophy of science remained almost unknown This was because the originality of his ideas entailed many lengthy battles with uncomprehending referees and he frequently published in Mexican journals of limited circulation In addition his strongly critical spirit inhibited his willingness to publish his ideas He was always most concerned by the very unsatisfactory situation in the philosophy of physics that is largely due to the generally poor knowledge that physicists and philosophers have of each other's disciplines Philosophers of science write at length about physics without any detailed first hand knowledge of how research is actually carried out Physicists for their part often implicitly assume naive or erroneous philosophical ideas and this often hinders their scientific work besides spreading further confusion if they try to give an account of what they are doing *The Theory of Epistemic Fields* Kofi Kissi Dompere, 2024-08-13 The book is about the development of the theory of epistemic fields with the corresponding relational and information fields as a framework for the understanding of strategies and tactics of the theory of knowing as the production of intellectual investment flows and the theory of knowledge accumulation as the production of intellectual capital stocks in systems of factories and departments providing the foundations for the development of open algorithms in the open space of problem solution dualities The concepts and the roles of thinking and reasoning with curiosity creativity hope Ill posed problems phantom problems unsolved problems misinformation disinformation fake news and courage are introduced defined and analyzed on the cognitive journeys over the space of ignorance knowledge dualities where dualistic polar conflicts between duals in the space of ignorance knowledge dualities are resolved with the instruments of fuzzy optimization the results of which are used to induced the zones of ignorance the zones of knowledge and the zones of contentions A complete development of the set of connecting paths of spaces and sub spaces is provided where all varieties categories and spaces reside in dualistic polar structures with knowledge stock viewed as a single tree with the same roots one trunk many branches and a fruit cocktail The ontological space contains the space of actual potential dualities as the primary category of knowing and the epistemological space contains the space of imagination reality dualities as the derived category of knowing within the space of primary derived dualities The space of potentials contains the space of imaginations which contains the sub spaces of possibility impossibility probability improbability and possibility probability dualities with corresponding spaces of necessity freedom and anticipation expectation dualities leading to the conception of the possible world impossible world dualities in the space of semantic non semantic dualities This book is also a continuation of the sequence of my works on the theories of paradigms of thought rationality info statics info dynamics entropy problem solution dualities in self contained

mathematics and philosophy and their relational connectivity to information language knowing knowledge cognitive practices and open matching learning relative to nominalism and the space of construction reduction dualities over the spaces of fundamental applied production consumption input output and cost benefit dualities Epistemology, Methodology, and Philosophy of Science Wilhelm K. Essler, H. Putnam, W. Stegmüller, 2013-06-29 Professor C G Hempel known to a host of admirers and friends as Peter Hempel is one of the most esteemed and best loved philosophers in the If an Empiricist Saint were not somewhat of a Meinongian Impos world sible Object one might describe Peter Hempel as an Empiricist Saint In deed he is as admired for his brilliance intellectual flexibility and crea tivity as he is for his warmth kindness and integrity and does not the presence of so many wonderful qualities in one human being assume the dimensions of an impossibility But Peter Hempel is not only possible but actual One of us Hilary Putnam remembers vividly the occasion on which he first witnessed Hempel in action It was 1950 and Quine had begun to attack the analytic synthetic distinction a distinction which Carnap and Reichenbach had made a cornerstone if not the keystone of Logical Em piricist philosophy Hempel who is as quick to accept any idea that seems to contain real substance and insight as he is to demolish ideas that are empty or confused was one of the first leading philosophers outside of Quine s immediate circle to join Quine in his attack Hempel had come to Los Angeles where Reichenbach taught on a visit and a small group consisting of Reichenbach and a few of his graduate students were gath ered together in Reichenbach s home to hear Hempel defend the new posi tion *The Theory of Info-Dynamics: Rational Foundations of Information-Knowledge Dynamics* Kofi K. Dompere, 2017-12-06 This book focuses on the development of a theory of info dynamics to support the theory of info statics in the general theory of information It establishes the rational foundations of information dynamics and how these foundations relate to the general socio natural dynamics from the primary to the derived categories in the universal existence and from the potential to the actual in the ontological space It also shows how these foundations relate to the general socio natural dynamics from the potential to the possible to give rise to the possibility space with possibilistic thinking from the possible to the probable to give rise to possibility space with probabilistic thinking and from the probable to the actual to give rise to the space of knowledge with paradigms of thought in the epistemological space The theory is developed to explain the general dynamics through various transformations in quality quantity space in relation to the nature of information flows at each variety transformation The theory explains the past present future connectivity of the evolving information structure in a manner that illuminates the transformation problem and its solution in the never ending information production within matter energy space under socio natural technologies to connect the theory of info statics which in turn presents explanations to the transformation problem and its solution The theoretical framework is developed with analytical tools based on the principle of opposites systems of actual potential polarities negative positive dualities under different time structures with the use of category theory fuzzy paradigm of thought and game theory in the fuzzy stochastic cost benefit space The rational foundations are enhanced with

categorial analytics The value of the theory of info dynamics is demonstrated in the explanatory and prescriptive structures of the transformations of varieties and categorial varieties at each point of time and over time from parent offspring sequences It constitutes a general explanation of dynamics of information knowledge production through info processes and info processors induced by a socio natural infinite set of technologies in the construction destruction space *Methodology, Epistemology, and Philosophy of Science* Carl G. Hempel, H. Putnam, Wilhelm K. Essler, 2013-03-09

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