Chaotic Logic Language Thought And Reality From The Perspective Of Complex Systems Science Author Ben Goertzel Published On July 1994

This book presents a select group of papers that provide a comprehensive view of the models and applications of chaos theory in medicine, biology, ecology, economy, electronics, mechanical, and the human sciences. Covering both the experimental and theoretical aspects of the subject, it examines a range of current topics of interest. It consid

This book attempts to marry truth-conditional semantics with cognitive linguistics in the church of computational neuroscience. To this end, it examines the truth-conditional meanings of coordinators, quantifiers, and collective predicates as neurophysiological phenomena that are amenable to a neurocomputational analysis. Drawing inspiration from work on visual processing, and especially the simple/complex cell distinction in early vision (V1), we claim that a similar two-layer architecture is sufficient to learn the truth-conditional meanings of the logical coordinators and logical quantifiers. As a prerequisite, much discussion is given over to what a neurologically plausible representation of the meanings of

these items would look like. We eventually settle on a representation in terms of correlation, so that, for instance, the semantic input to the universal operators (e.g. and, all)is represented as maximally correlated, while the semantic input to the universal negative operators (e.g. nor, no)is represented as maximally anticorrelated. On the basis this representation, the hypothesis can be offered that the function of the logical operators is to extract an invariant feature from natural situations, that of degree of correlation between parts of the situation. This result sets up an elegant formal analogy to recent models of visual processing, which argue that the function of early vision is to reduce the redundancy inherent in natural images. Computational simulations are designed in which the logical operators are learned by associating their phonological form with some degree of correlation in the inputs, so that the overall function of the system is as a simple kind of pattern recognition. Several learning rules are assayed, especially those of the Hebbian sort, which are the ones with the most neurological support. Learning vector quantization (LVQ) is shown to be a perspicuous and efficient means of learning the patterns that are of interest. We draw a formal parallelism between the initial, competitive layer of LVQ and the simple cell layer in V1, and between the final, linear layer of LVQ and the complex cell layer in V1, in that the initial layers are both selective, while the final

layers both generalize. It is also shown how the representations argued for can be used to draw the traditionally-recognized inferences arising from coordination and quantification, and why the inference of subalternacy breaks down for collective predicates. Finally, the analogies between early vision and the logical operators allow us to advance the claim of cognitive linguistics that language is not processed by proprietary algorithms, but rather by algorithms that are general to the entire brain. Thus in the debate between objectivist and experiential metaphysics, this book falls squarely into the camp of the latter. Yet it does so by means of a rigorous formal, mathematical, and neurological exposition – in contradiction of the experiential claim that formal analysis has no place in the understanding of cognition. To make our own counter-claim as explicit as possible, we present a sketch of the LVQ structure in terms of mereotopology, in which the initial layer of the network performs topological operations, while the final layer performs mereological operations.

Imagine a future world where computers can create universes -- digital environments made from binary ones and zeros. Imagine that within these universes there exist biological forms that reproduce, grow, and think. Imagine plantlike forms, ant colonies, immune systems, and brains, all adapting, evolving, and getting better at solving problems. Imagine if our computers became

greenhouses for a new kind of nature. Just think what digital biology could do for us. Perhaps it could evolve new designs for us, think up ways to detect fraud using digital neurons, or solve scheduling problems with ants. Perhaps it could detect hackers with immune systems or create music from the patterns of growth of digital seashells. Perhaps it would allow our computers to become creative and inventive. Now stop imagining. digital biology is an intriguing glimpse into the future of technology by one of the most creative thinkers working in computer science today. As Peter J. Bentley explains, the next giant step in computing technology is already under way as computer scientists attempt to create digital universes that replicate the natural world. Within these digital universes, we will evolve solutions to problems, construct digital brains that can learn and think, and use immune systems to trap and destroy computer viruses. The biological world is the model for the next generation of computer software. By adapting the principles of biology, computer scientists will make it possible for computers to function as the natural world does. In practical terms, this will mean that we will soon have "smart" devices, such as houses that will keep the temperature as we like it and automobiles that will start only for drivers they recognize (through voice recognition or other systems) and that will navigate highways safely and with maximum fuel efficiency. Computers will soon be powerful enough and small

enough that they can become part of clothing. "Digital agents" will be able to help us find a bank or restaurant in a city that we have never visited before, even as we walk through the airport. Miniature robots may even be incorporated into our bodies to monitor our health. Digital Biology is also an exploration of biology itself from a new perspective. We must understand how nature works in its most intimate detail before we can use these same biological processes inside our computers. Already scientists engaged in this work have gained new insights into the elegant simplicity of the natural universe. This is a visionary book, written in accessible, nontechnical language, that explains how cutting-edge computer science will shape our world in the coming decades.

Creating Internet Intelligence is an interdisciplinary treatise exploring the hypothesis that global computer and communication networks will one day evolve into an autonomous intelligent system, and making specific recommendations as to what engineers and scientists can do today to encourage and shape this evolution. A general theory of intelligent systems is described, based on the author's previous work; and in this context, the specific notion of Internet intelligence is fleshed out, in its commercial, social, psychological, computer-science, philosophical, and theological aspects. Software engineering work carried out by the author and his team over the last few years, aimed at seeding

the emergence of Internet intelligence, is reviewed in some detail, including the Webmind AI Engine, a uniquely powerful Internet-based digital intelligence, and the Webworld platform for peer-to-peer distributed cognition and artificial life. The book should be of interest to computer scientists, philosophers, and social scientists, and more generally to anyone concerned about the nature of the mind, or the evolution of computer and Internet technology and its effect on human life.
The generation of meaning lies at the foundation of one's mind. Hardy suggests it may also be a force shaping objective reality. Usually seen as a purely mental process, meaning is in fact a powerful organizing force, pervading the outside world, bridging the gap between mind and matter.
Incorporating chaos theory into psychology and the life sciences, this text includes empirical studies of neural encoding, memory, eye movements, warfare, business cycles and selection of time series analysis algorithms. There are theoretical chapters on emergence and social dynamics, and clinical contributions dealing with: the measurement of quality of life for psychiatric patients; psychosis; the organization of self; and the role of love in family dynamics. Finally ideas from non-linear dynamics are applied to understanding the creative process.
This book constitutes the proceedings of the Third International Conference on

Conceptual Structures, ICCS '95, held in Santa Cruz, California in August 1995. Conceptual structures are a modern treatment of Peirce's existential graphs, a graphic notation for classical logic with higher order extensions. Besides three invited papers, there are included 21 revised full papers selected from 58 submission. The volume reflects the state-of-the-art in this research area of growing interest. The papers are organized in sections on natural language, applications, programming in conceptual graphs, machine learning and knowledge acquisition, hardware and implementation, graph operations, and ontologies and theory.

This publication reflects on the discussion on using chaos theory for the study of society. It explores the interface between chaos theory and the social sciences. A broad variety of fields (including Sociology, Anthropology, Economics, Political Science, Management, Philosophy and Cognitive Sciences) is represented in the book. The leading themes are: Conceptual and Methodological Issues, Social Connectionism and the Connectionist Mind, Social Institutions and Public Policy, and Social Simulations. The book includes the following topics: the relevance of the complexity-chaos paradigm for analyzing social systems, the usefulness of nonlinear dynamics for studying the formation and sustainability of social groups, the comparison between spontaneous social orders and spontaneous

biological/natural orders, the building of Artificial Societies, and the contribution of the chaos paradigm to a better understanding and formulation of public policies.
The Systems Approach and Its Enemies (C. West Churchman, 1979) is one of Churchman's most significant works. In this particular writing he displayed two main tendencies, that he was a Skeptic and that he showed Socratic Wisdom. In this book the editors seeks to follow up on these two themes and reveal how modern authors interpret Churchman's ideas, apply them to their own line of thinking and develop their own brand of Systemics.
Of the nature of an integral term in fuzzy control designs -- Some practical implications of the dynamic compensation results -- Concerning the rationale of fuzzy control -- Rational approach to research in fuzzy control and other applications of fuzzy set theory -- Prospects for further applications and research.
As suggested by the title of this book, I will present a collection of coherently related applications and a theoretical development of a general systems theory. Hopefully, this book will invite all readers to sample an exciting and challenging (even fun!) piece of interdisciplinary research, that has characterized the scientific and technological achievements of the twentieth century. And, I hope that many of them will be motivated to do additional reading and to contribute to topics along the lines described in the following pages. Since the applications in

this volume range through many scientific disciplines, from sociology to atomic physics, from Einstein's relativity theory to Dirac's quan tum mechanics, from optimization theory to unreasonable effectiveness of mathe matics to foundations of mathematical modeling, from general systems theory to Schwartz's distributions, special care has been given to write each application in a language appropriate to that field. That is, mathematical symbols and abstractions are used at different levels so that readers in various fields will find it possible to read. Also, because of the wide range of applications, each chapter has been written so that, in general, there is no need to reference a different chapter in order to understand a specific application. At the same time, if a reader has the desire to go through the entire book without skipping any chapter, it is strongly suggested to refer back to Chapters 2 and 3 as often as possible.

This book studies linguistic complexity and the processes by which it arises and is maintained, focusing not so much on what one can say in a language as how it is said. Complexity is not seen as synonymous with "difficulty" but as an objective property of a system — a measure of the amount of information needed to describe or reconstruct it. Grammatical complexity is the result of historical processes often subsumed under the rubric of grammaticalization and involves what can be called mature linguistic phenomena, that is, features that take time

to develop. The nature and characteristics of such processes are discussed in detail, as well as the external and internal factors that favor or disfavor stability and change in language.

This book is a printed edition of the Special Issue "Second Generation General System Theory: Perspectives in Philosophy and Approaches in Complex Systems" that was published in Systems

The previous edition provided the first resource for examining how the Internet affects our definition of who we are and our communication and work patterns. It examined how normal behavior differs from the pathological with respect to Internet use. Coverage includes how the internet is used in our social patterns: work, dating, meeting people of similar interests, how we use it to conduct business, how the Internet is used for learning, children and the Internet, what our internet use says about ourselves, and the philosophical ramifications of internet use on our definitions of reality and consciousness. Since its publication in 1998, a slew of other books on the topic have emerged, many speaking solely to internet addiction, learning on the web, or telehealth. There are few competitors that discuss the breadth of impact the internet has had on intrpersonal, interpersonal, and transpersonal psychology. Provides the first resource for looking at how the Internet affects our definition of who we are

Examines the philosophical ramifications of Internet use and our definitions of self, reality, and work Explores how the Internet is used to meet new friends and love interests, as well as to conduct business Discusses what represents normal behavior with respect to Internet use

A foundational book explaining the sources and uses of nonlinear dynamics in the social sciences

Traditional science focuses on understanding the individual pieces of a problem. How does a cell work? How does a neuron work? How does an individual investor behave? Tremendous strides have been made in answering these questions.The next logical step was to take knowledge about the individual components, and use that knowledge to understand the behavior of groups of components. That didn't work, but complexity theory may hold the answers. Many scientists believe that complexity theory may answer many of life's most puzzling mysteries. Complexity theory includes areas such as chaos theory, genetic programming, and fractals. William Roetzheim discusses complexity theory in an understandable manner that will appeal to all audiences. This book takes the approach of explaining concepts through the use of examples and demonstrations rather than mathematics and theory.

This book has a rather strange history. It began in spring 1989, thirteen years after our

Systems Science Department at SUNY-Binghamton was established, when I was asked by a group of students in our doctoral program to have a meeting with them. The spokesman of the group, Cliff Joslyn, opened our meeting by stating its purpose. I can closely paraphrase what he said: "We called this meeting to discuss with you, as Chairman of the Department, a fundamental problem with our systems science curriculum. In general, we consider it a good curriculum: we learn a lot of concepts, principles, and methodological tools, mathematical, computational, heu ristic, which are fundamental to understanding and dealing with systems. And, yet, we learn virtually nothing about systems science itself. What is systems science? What are its historical roots? What are its aims? Where does it stand and where is it likely to go? These are pressing questions to us. After all, aren't we supposed to carry the systems science flag after we graduate from this program? We feel that a broad introductory course to systems science is urgently needed in the curriculum. Do you agree with this assessment?" The answer was obvious and, yet, not easy to give: "I agree, of course, but I do not see how the situation could be alleviated in the foreseeable future.

Describes how business managers can use scientific concepts to anticipate industrial trends and stay a step ahead of their competitors

In The Emerging Consensus of Social Systems Theory Bausch summarizes the works of over 30 major systemic theorists. He then goes on to show the converging areas of consensus among these out-standing thinkers. Bausch categorizes the social aspects of current systemic thinking as falling into five broadly thematic areas: designing social systems, the structure of the social world, communication, cognition and epistemology. These five areas are foundational for a theoretic and practical systemic synthesis. They were topics of contention in

a historic debate between Habermas and Luhmann in the early 1970's. They continue to be contentious topics within the study of social philosophy. Since the 1970's, systemic thinking has taken great strides in the areas of mathematics, physics, biology, psychology, and sociology. This book presents a spectrum of those theoretical advances. It synthesizes what various strains of contemporary systems science have to say about social processes and assesses the quality of the resulting integrated explanations. Bausch gives a detailed study of the works of many present-day systems theorists, both in general terms, and with regard to social processes. He then creates and validates integrated representations of their thoughts with respect to his own thematic classifications. He provides a background of systemic thinking from an historical context, as well as detailed studies of developments in sociological, cognitive and evolutionary theory. This book presents a coherent, dynamic model of a self-organizing world. It proposes a creative and ethical method of decision-making and design. It makes explicit the relations between structure and process in the realms of knowledge and being. The new methodology that evolves in this book allows us to deal with enormous complexity, and to relate ideas so as to draw out previously unsuspected conclusions and syntheses. Therein lies the elegance and utility of this model.

This text describes how 18th-century awareness of the interplay between fixity and instability in printed texts demonstrates the role print played in developing Samuel Johnson's awareness of print culture's impact on human beings ethically, politically, and aesthetically.

In this book, fascinating autobiographical accounts by leading scholars in a variety of fields and disciplines provide a rich introduction to the art and science of complexity and systems thinking. We learn how the authors' interest in complexity thinking developed, the key figures

and texts they encountered along the way, the experiences that shaped their path, their major works, and their personal journeys. This volume serves as an introduction to complexity as well as a vivid account of the personal and intellectual development of important scholars. This book was originally published as a special issue of World Futures.

We live in a moment of unprecedented complexity, an era in which change occurs faster than our ability to comprehend it. With "The Moment of Complexity", Mark C. Taylor offers a map for the unfamiliar terrain opening in our midst, unfolding an original philosophy of our time through a remarkable synthesis of science and culture. According to Taylor, complexity is not just a breakthrough scientific concept but the defining quality of the post-Cold War era. The flux of digital currents swirling around us, he argues, has created a new network culture with its own distinctive logic and dynamic.

This book summarizes a network of interrelated ideas which I have developed, off and on, over the past eight or ten years. The underlying theme is the psychological interplay of order and chaos. Or, to put it another way, the interplay of deduction and induction. I will try to explain the relationship between logical, orderly, conscious, rule-following reason and fluid, self organizing, habit-governed, unconscious, chaos-infused intuition. My previous two books, The Structure of Intelligence and The Evolving Mind, briefly touched on this relationship. But these books were primarily concerned with other matters: SI with constructing a formal language for discussing mentality and its mechanization, and EM with exploring the role of evolution in thought. They danced around the edges of the order/chaos problem, without ever fully entering into it. My goal in writing this book was to go directly to the core of mental process, "where angels fear to tread" -- to tackle all the sticky issues which it is considered prudent to avoid: the nature of

consciousness, the relation between mind and reality, the justification of belief systems, the connection between creativity and mental illness,.... All of these issues are dealt with here in a straightforward and unified way, using a combination of concepts from my previous work with ideas from chaos theory and complex systems science.

Post-structuralism is recognised as a major force within literary and cultural studies. This book is the first to apply the theory to politics and to show the ways in which it can illuminate political theory and analysis. As such it is likely to become a key text in the development of this area, providing a stimulating introduction to the subject. Authors explore the two-way relationship, showing not only that post-structuralism can enhance the study of politics, but also that advocates of post-structuralism can benefit from being open to the lessons political studies can teach. The book aims to* Clarify the relationship of contemporary theory to politics* Open up a new intellectual interface* Create a space for exchange between disciplines* Provide a statement of the role of post-structuralist theory in politicsCovering three main sections - What is Post-structuralist Political Theory?; Post-structuralism and Political Analysis; and The Question of the Political - the authors draw on themes raised by Continental thinkers such as Derrida, Nancy and Deleuze, and Anglo-American thinkers such as Butler and Connolly in their questioning of the theoretical and empirical understanding of contemporary politics.Key Features:* First systematic examination of post-structuralism to see what it may mean for political studies* Advances its own rigorous and theoretically informed position* Cutting edge: provides a vibrant introduction to this area of political thought and analysis* Brings clarity to the two-way relationship between post-structuralism and politics

"What is mind?" "Can we build synthetic or artificial minds?" Think these questions are only

reserved for Science Fiction? Well, not anymore. This collection presents a diverse overview of where the development of artificial minds is as the twenty first century begins. Examined from nearly all viewpoints, Visions of Mind includes perspectives from philosophy, psychology, cognitive science, social studies and artificial intelligence. This collection comes largely as a result of many conferences and symposiums conducted by many of the leading minds on this topic. At the core is Professor Aaron Sloman's symposium from the spring 2000 UK Society for Artificial Intelligence conference. Authors from that symposium, as well as others from around the world have updated their perspectives and contributed to this powerful book. The result is a multi-disciplinary approach to the long term problem of designing a human-like mind, whether for scientific, social, or engineering purposes. The topics addressed within this text are valuable to both artificial intelligence and cognitive science, and also to the academic disciplines that they draw on and feed. Among those disciplines are philosophy, computer science, and psychology.

Cybernetic pioneer Warren McCullough asked: "What is a man, that he may know a number; and what is a number, that a man may know it?" Thinking along much the same lines, my question here is: "What is a creative mind, that it might emerge from a complex system; and what is a complex system, that it might give rise to a creative mind?" Complexity science is a fashionable topic these days. My perspective on complexity, however, is a somewhat unusual one: I am interested in complex systems science principally as it reflects on abstract mathematical, computational models of mind. In my three previous books, The Structure of Intelligence, Evolving Mind, and Chaotic Logic, I have outlined a comprehensive complex-systems-theoretic theory of mind that I now call the psynet model. This book is a continuation

of the research program presented in my previous books (and those books will be frequently referred to here, by the nicknames EM and CL). One might summarize the trajectory of thought spanning these four books as follows. SI formulated a philosophy and mathem- ics of mind, based on theoretical computer science and the concept of "pattern. " EM analyzed the theory of evolution by natural selection in similar terms, and used this computational theory of evolution to establish the evolutionary nature of thought.

This volume explores the multiple aspects of morphological complexity, offering typological, acquisitional, sociolinguistic, and diachronic perspectives. The analyses are based on rich empirical data from a wide range of languages, as well as experimental data from artificial language learning.

The purpose of this book is to illustrate the fundamental concepts of complexity and complex behavior and the best methods to characterize this behavior by means of their applications to some current research topics from within the fields of fusion, earth and solar plasmas. In this sense, it is a departure from the many books already available that discuss general features of complexity. The book is divided in two parts. In the first part the most important properties and features of complex systems are introduced, discussed and illustrated. The second part discusses several instances of possible complex phenomena in magnetized plasmas and some of the analysis tools that were introduced in the first part are used to characterize the dynamics in these systems. A list of problems is proposed at the end of each chapter. This book is intended for graduate and post-graduate students with a solid college background in mathematics and classical physics, who intend to work in the field of plasma physics and, in particular, plasma turbulence. It will also be of interest to senior scientists who have so far

approached these systems and problems from a different perspective and want a new fresh angle.

Deleuze's readings of Hume, Spinoza, Bergson and Nietzsche respond to philosophical critiques of classical and modern empiricism. However, Deleuze's arguments against those critiques - by Kant, Hegel, Husserl and Heidegger - consolidate the philosophy of immanence that can be called 'transcendental empiricism'. Marc Rolli offers us a detailed examination of Gilles Deleuze's philosophy of transcendental empiricism. He demonstrates that Deleuze takes up and radicalises the empiricist school of thought developing a systematic alternative to the mainstreams of modern continental philosophy.

Here is a comprehensive presentation of methodology for the design and synthesis of an intelligent complex robotic system, connecting formal tools from discrete system theory, artificial intelligence, neural network, and fuzzy logic. The necessary methods for solving real time action planning, coordination and control problems are described. A notable chapter presents a new approach to intelligent robotic agent control acting in a realworld environment based on a lifelong learning approach combining cognitive and reactive capabilities. Another key feature is the homogeneous description of all solutions and methods based on system theory formalism.

0. 0 Psychology versus Complex Systems Science Over the last century, psychology has become much less of an art and much more of a science. Philosophical speculation is out; data collection is in. In many ways this has been a very positive trend. Cognitive science (Mandler, 1985) has given us scientific analyses of a variety of intelligent behaviors: short-term memory, language processing, vision processing, etc. And thanks to molecular psychology

(Franklin, 1985), we now have a rudimentary understanding of the chemical processes underlying personality and mental illness. However, there is a growing feeling-particularly among non-psychologists (see e. g. Sommerhoff, 1990) - that, with the new emphasis on data collection, something important has been lost. Very little attention is paid to the question of how it all fits together. The early psychologists, and the classical philosophers of mind, were concerned with the general nature of mentality as much as with the mechanisms underlying specific phenomena. But the new, scientific psychology has made disappointingly little progress toward the resolution of these more general questions. One way to deal with this complaint is to dismiss the questions themselves. After all, one might argue, a scientific psychology cannot be expected to deal with fuzzy philosophical questions that probably have little empirical signifi cance. It is interesting that behaviorists and cognitive scientists tend to be in agreement regarding the question of the overall structure of the mind.

Artificial Intelligence Tools: Decision Support Systems in Condition Monitoring and Diagnosis discusses various white- and black-box approaches to fault diagnosis in condition monitoring (CM). This indispensable resource:Addresses nearest-neighbor-based, clustering-based, statistical, and information theory-based techniquesConsiders the merits of e

In 1978, when the book Living Systems was published, it contained the prediction that the sciences that were concerned with the biological and social sciences would, in the future, be stated as rigorously as the “hard sciences” that study such nonliving phenomena as temperature, distance, and the interaction of chemical elements. Principles of Quantitative Living Systems Science, the first of

a planned series of three books, begins an attempt to fulfill that prediction. The view that living things are similar to other parts of the physical world, differing only in their complexity, was explicitly stated in the early years of the twentieth century by the biologist Ludwig von Bertalanffy. His ideas could not be published until the end of the war in Europe in the 1940s. Von Bertalanffy was strongly opposed to vitalism, the theory current among biologists at the time that life could only be explained by recourse to a “vital principle” or God. He c- sidered living things to be a part of the natural order, “systems” like atoms and molecules and planetary systems. Systems were described as being made up of a number of interrelated and interdependent parts, but because of the interrelations, the total system became more than the sum of those parts. These ideas led to the development of systems movements, in both Europe and the United States, that included not only biologists but scientists in other fields as well. Systems societies were formed on both continents.

Making Sense of Inner Sense 'Terra cognita' is terra incognita. It is difficult to find someone not taken abackand fascinated by the incomprehensible but indisputable fact: there are material systems which are aware of themselves. Consciousness is self-cognizing code. During homo sapiens's relentness and often frustrated search for self-understanding various theories of consciousness

have been and continue to be proposed. However, it remains unclear whether and at what level the problems of consciousness and intelligent thought can be resolved. Science's greatest challenge is to answer the fundamental question: what precisely does a cognitive state amount to in physical terms? Albert Einstein insisted that the fundamental ideas of science are essentially simple and can be expressed in a language comprehensible to everyone. When one thinks about the complexities which present themselves in modern physics and even more so in the physics of life, one may wonder whether Einstein really meant what he said. Are we to consider the fundamental problem of the mind, whose understanding seems to lie outside the limits of the mind, to be essentially simple too? Knowledge is neither automatic nor universally deductive. Great new ideas are typically counterintuitive and outrageous, and connecting them by simple logical steps to existing knowledge is often a hard undertaking. The notion of a tensor was needed to provide the general theory of relativity; the notion of entropy had to be developed before we could get full insight into the laws of thermodynamics; the notice of information bit is crucial for communication theory, just as the concept of a Turing machine is instrumental in the deep understanding of a computer. To understand something, consciousness must reach an adequate intellectual level, even more so in order to understand itself. Reality is

full of unending mysteries, the true explanation of which requires very technical knowledge, often involving notions not given directly to intuition. Even though the entire content and the results of this study are contained in the eight pages of the mathematical abstract, it would be unrealistic and impractical to suggest that anyone can gain full insight into the theory that presented here after just reading abstract. In our quest for knowledge we are exploring the remotest areas of the macrocosm and probing the invisible particles of the microcosm, from tiny neutrinos and strange quarks to black holes and the Big Bang. But the greatest mystery is very close to home: the greatest mystery is human consciousness. The question before us is whether the logical brain has evolved to a conceptual level where it is able to understand itself.

Social (psychological and sociological) systems present considerable difficulties for modellers due to their complexity, multidimensionality, uncertainty and irreducibility. The book proposes that response functions (MRF) be used as a method of constructing purposeful, credible and integrated social systems' models from data and prior knowledge or information. A semi-empirical, or "grey-box", MRF model may be regarded as a trade-off between a knowledge-based model and a "black-box" (empirical) model. It may embody all the existing knowledge on the process (or a part thereof) and, in addition, it relies on

parameterised functions, whose parameters are determined from measurements. Observations contain hidden information on the processes under consideration and one of the main purposes of the proposed method is to "extract" and describe these hidden relationships. Parameterisation offers ways to couple qualitative with quantitative analysis. This combination makes it possible to take into account all the phenomena that are not modelled with the required accuracy through prior knowledge. Although only a simplified picture of the processes is modelled, a "grey box" system model provides some insight into the system processes. These processes are featured by chains of causality, highlighting stressors and variables responsive to stressors. The method of response functions is a nonlinear regression method that implies credible models in the sense that they are identifiable and, hopefully, explain system output behaviour satisfactorily. For case studies the authors have selected the problems usually studied by psychologists and sociologists with statistical procedures, such as investigation of variance and discriminant analysis based on the general linear model or one of its multivariate generalisations (structural equation models, etc.); disordered eating and obesity; subjective well-being and alexithymia. An accompanying CD-ROM contains the demonstration versions of three models that are discussed in the various chapters.The Method of Response Functions in

Psychology and Sociology is aimed at Mathematical Psychologists; Mathematical Sociologists; Applied Psychologists; Sociologists and Social Practitioners. It will also be suitable for use on undergraduate as well as graduate and postgraduate courses specializing in these areas.

Lissack and Rivkin, along with a panel of distinguished academics and executives, identify critical topics in the study of complexity science.

An evaluation of the work of contemporary French authors through the lens of the fuzzy set theory of mathematics.

Faust stories are found across the ages and the arts. From its earliest to most recent expressions, the Faust figure continues to capture our imagination, dealing with problems and themes that are still relevant for a twenty-first century audience. Of the many variations on the Faust-myth, Goethe's remains especially provocative and laden with meaning and is the work most responsible for determining the subsequent character of the Faust archetype. His Faust reflects an individual who asserts, yet wrestles unrelentingly with the futility of faith, the bankruptcy of knowledge, and the loss of meaning. One of the greatest texts of both German and world literature, Faust, Parts I and II, confronts us with pressing questions about rebellion and suffering, faith and its loss, reality and simulation, order and chaos, weakness and power, technology and human improvement.

This monograph offers a new interpretation of Goethe's famous play, emphasising its continuing significance today.

This book constitutes the refereed proceedings of the 10th Conference on Computability in Europe, CiE 2014, held in Budapest, Hungary, in June 2014. The 42 revised papers presented were carefully reviewed and selected from 78 submissions and included together with 15 invited papers in this proceedings. The conference had six special sessions: computational linguistics, bio-inspired computation, history and philosophy of computing, computability theory, online algorithms and complexity in automata theory.