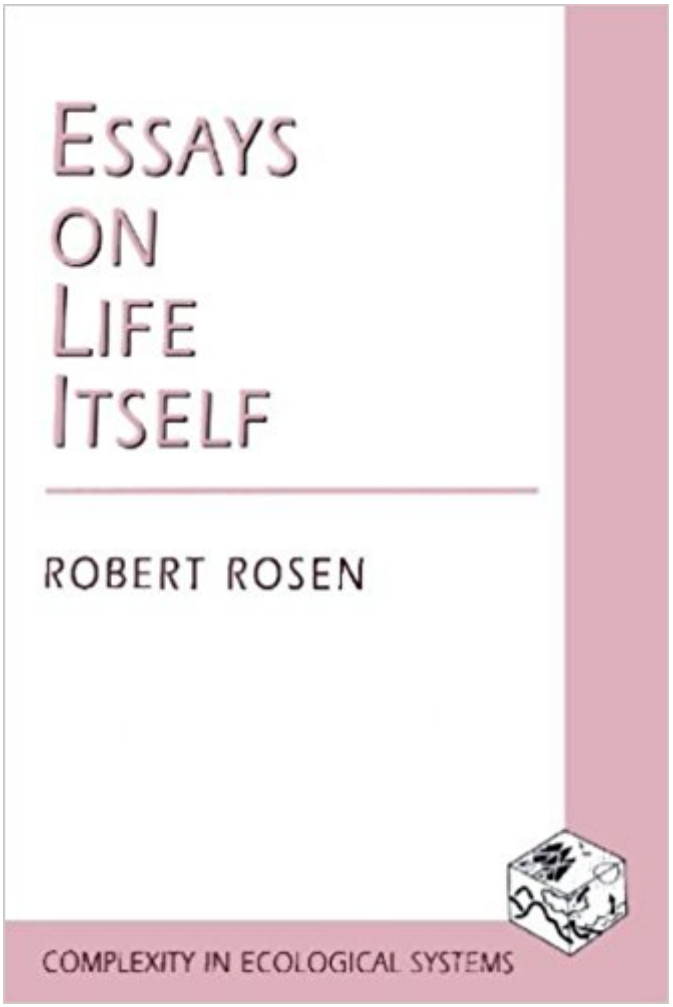
Essays On Life Itself (Complexity In Ecological Systems)



Synopsis

Compiling twenty articles on the nature of life and on the objective of the natural sciences, this remarkable book complements Robert Rosen’s groundbreaking Life Itself—a work that influenced a wide range of philosophers, biologists, linguists, and social scientists. In Essays on Life Itself, Rosen takes to task the central objective of the natural sciences, calling into question the attempt to create objectivity in a subjective world and forcing us to reconsider where science can lead us in the years to come.

Book Information

File Size: 7783 KB

Print Length: 376 pages

Publisher: Columbia University Press; 1500 edition (June 19, 2012)

Publication Date: June 19, 2012

Sold by:Ã Â Digital Services LLC

Language: English

ASIN: B008CP1DVU

Text-to-Speech: Enabled

X-Ray: Not Enabled

Word Wise: Enabled

Lending: Not Enabled

Screen Reader: Supported

Enhanced Typesetting: Enabled

Best Sellers Rank: #1,531,408 Paid in Kindle Store (See Top 100 Paid in Kindle Store) #99 inÃ Â Books > Science & Math > Mathematics > Applied > Biomathematics #103 inÃ Â Kindle Store > Kindle eBooks > Nonfiction > Science > Biological Sciences > Biophysics #317 inÃ Â Kindle Store > Kindle eBooks > Nonfiction > Science > Biological Sciences > Biology > Molecular Biology

Customer Reviews

This collection of essays, along with Rosen’s other book _Life Itself_, are mandatory reading for any scientist or any astute layperson interested in biology, physics or philosophy of science.Rosen was a very insightful and technically capable theoretical biologist. His work - first as a student of physicist and theoretical biologist Nicholas Rashevsky, and later as professor emeritus at Dalhousie - is unquestionably of the level of importance of Einstein’s Special/General Theory of Relativity, or

Godel’s Incompleteness Theorems. This is a grand claim to make, but once you read Rosen’s work, you will see for yourself.These are not the easiest books to read, despite Rosen’s excellent writing skills. The difficulty is two-fold. First and foremost, the new concepts and paradigms presented are of such breadth and profundity that it can take several readings to begin to fully grasp them adequately. Secondly, Rosen is mathematically (and otherwise) quite astute. The reader will encounter to some degree: category theory, topology, catastrophe theory (Rosen dedicates a chapter on genericity in _Essays_ to Rene Thom), differential equations, dynamical systems, Godel, Church-Turing, as well as philosophical topics of epistemology, ontology, and foundations of biology, mathematics and physics.This should not, however, deter even the non-professional. Particularly in _Life Itself_, Rosen progresses carefully and patiently, even including a short intro to Category Theory. One can gloss over some of the math and still garner most of the insights from the text alone. _Essays_ utilizes a wider range of math skills, since that book covers a broader range of topics, but it is still quite accessible to the careful and astute reader.In _Life Itself_, Rosen was investigating the question posed by Erwin Shrodinger originally in his 1943 lecture "What is Life?". Rosen’s search led him to peel back in careful detail the foundations of Newtonian mechanics and reveal the underlying tacit assumptions of a state/phase-based physics and the repercussions for science in general, and biology in particular.By setting aside state/phase-based physics, Rosen then proceeded to layout the groundwork for an atemporal relational biology based on functional organization and to methodically investigate the theoretical limits of mechanistic systems, including along the way: simulation, Turing machines, and the epistemology and ontology of such systems. The distinction eventually becomes clear that any such algorithmic mechanisms cannot embody the kinds of impredicative complexity that are characteristic of an organism. Because the syntax of Newtonian physics can express no such closed loops of entailment, "life" cannot even be described in that model of physics, much less modeled in any complete way. Thus it is that biological organisms are not a mere subset of current physics, but are representative of complexities that require physics to be enlarged.In _Essays on Life Itself_, Rosen uses his considerable abilities across a broad spectrum of topics to continue the ideas from _Life Itself_. It is difficult to describe how topics as diverse as the assumptions of Pythagoras, the Turing test, universal unfoldings, morphogenesis, mind-brain problem, and more can be in the same book. Mostly, they all in one way or another accomplish one task: to look beyond the limits of how a problem is currently being viewed, and to see it from a larger perspective. Often, these perspectives take Rosen into terrain others would avoid, since they sometimes lead into the non-algorithmic / noncomputable, or the breakdown of the presumed subject-object division, or other kinds of "messy" scenarios.Often they

lead into "complex systems", where Rosen uses the word "complex" to define a certain class of systems - those systems have symptoms of being: impredicative, non-algorithmic, context-dependent, semantic, nonformalizable. This classification is not a desire for obfuscation or ineffability, but is as rigorous as the nonformalizability of Number Theory or the unsolvability in closed form of the n-body problem. It is a complexity akin to the size of a transfinite number: it is not simply a matter of merely being hugely complicated, it is rather an entirely different order of system structure.However, guided by Rosen, one does not feel uneasy following his path. Rather one feels enriched both in knowledge and in paradigm. Distinguishing the broader generic case from the degenerate or special is a characteristic theme in Rosen. The unfamiliar terrain he argues to is thus not some void, but a grander scale that subsumes the orthodox view.In that grander view, it may become more clear that some problems are based on incorrect assumptions, while some are more difficult or complex than in the more limited original view. However, it is apparent that Rosen is uninterested in making problems appear simpler by ignoring those difficulties - he is interested in where the science leads. It is an immensely richer, complex view of the physical world that one comes away with. As such, it presents some difficult challanges, but it also opens up vast opportunities - opportunities not visible in the neat and tidy fantasy model of science that generally prevails where it is assumed that with enough effort everything can be reduced or calculated.Rosen writes deliberately and with precision, and is both a critical and a profound thinker. I hope that he one day receives the recognition and admiration he rightfully deserves.

This book is a powerfil critique of reductionist and/or simulation (modeling) approach to mind/body problem, and "what is life" question. Rosen builds his case against Church Thesis, arguing that contemporary mathematical and, more generally, scientific rigor, which bans impredicative loops from scientific discource, would not allow us to build what he calls "new science", which is needed to account for life and consciousness.More than once he mentiones Goedel Theorem, as well as various paradoxes, encountered by science over the centuries, emphasizing the fact, that they all are directly related to the impossibility to draw definite border between an observer and her object (not just in quantum physics).Although the book was very interesting for me, i felt that some essays essentially repeated the material, already covered in other parts of the same book. Also, this "new science", which Rosen thought is needed to deal with open systems, is never really described in any way, so we are left with critique only.I am not sure i fully agree with Rosen’s view of the Turing Test, which he only sees as a simulation approach to the mind (intelligence) problem. My understanding is that Turing Test should be rather understood in the "observer/object" context,

meaning that the participant makes a judgement, being, at the same time, fully incorporated into the system.In one of the essays Rosen says: "If somebody wants to call this ’vitalism’ - then ... so be it." With no constructive theory in site it’s a bit like this, to my understanding.

I am very astonished that Robert Rosen did not get the full attention he deserves. Rosen has brought up many fundamental ideas in biology that well deserve reading.

Excellent!

In a series of essays, Robert Rosen, the brilliant mathematical biologist whose name was made with earlier books such as "Anticipatory Systems" and "Life Itself" expounds his ideas both on the standard accepted dogma in biology today and some snippets of his own energetic investigations into new ideas about what biology is all about.Unlike many of his contemporaries Rosen is not afraid to let other areas influence his own ideas, e.g. he draws on philosophy especially the work covering epistemology and the Mind-Brain problem to deeply investigate the accepted state of biology today especially the, unexpectedly metaphysical, basis of the reductionistic approach to most of science as it is today. He investigates in 5 parts: Biology and Physics, Biology and the Mind, Genericity, Similarity and Dissimilarity in Biology and Biology and Technology.His initial concern is Schroedinger’s question "What is Life". Of course this can’t be answered today without in effect "loosing the organism" in the process. Rather than accept Schroedinger’s work as a standard exposition of the accepted view he maintains it is far more radical, this agrees well with earlier statements of Heisenberg who also supports the view that reductionistic science more and more shrinks the domain of "true" scientific investigation, or rather what may be considered scientific and what may be thought of as hocus-pocus or vitalism.Rosen does not shirk his responsibilities in exposing the weaknesses of the reductionistic and mechanistic views including in his critique the Church-Pythagoras Thesis, modeling, mimetics, simple and complex systems, Turing machines etc. Rosen emphasises that the ordinary mechanistic physics of today is the study of "simple systems" i.e. systems which are simulable or representable by a Turing machine, he categorically states that these systems are at most "complicated" but not "complex". In other words real organisms and living beings are in fact complex in the sense of not being mechanisms i.e. not being computable in the form of an algorithm as well as not formalisable. What is important are not just these radical ideas, which have been mentioned before in various forms by others, but rather Rosen’s ability to clarify and put them on some sort of solid footing without having them declared outright conceptual

mumbo-jumbo which is far more easy to do when the ideas are not well constructed and supported.All in all this is an excellent set of essays introducing Rosen's work for laymen although there are many technical terms which are assumed and I felt that at times his expositions was stunted just when it got going and you expected more, it's as if Rosen was just getting into it when he realised it's an essay he's writing and not a book. As such, I look forward to reading his original "Life Itself", "Anticipatory Systems" and other fascinating books which unfortunately are now out of print. Rosen is never short of deep mathematical understanding, in fact he had that rare ability to combine both great intuitive insight and the ability to convert it into mathematics. Although there is a lack of rigour in the mathematics it must be remembered that this is a set of essays and the underlying ground rules of the maths is assumed rather than swept under the carpet. Some essays require a good understanding of the maths used e.g. category theory, linear algebra, calculus. None of this should discourage the average reader because it can be followed without this knowledge base.I certainly hope that more mathematicians follow in his footsteps not avoiding the difficult areas of philosophy, applied mathematics and physical insight. Rosen will be missed.

Ecological Systems Framework The Big Picture: On the Origins of Life, Meaning, and the Universe Itself