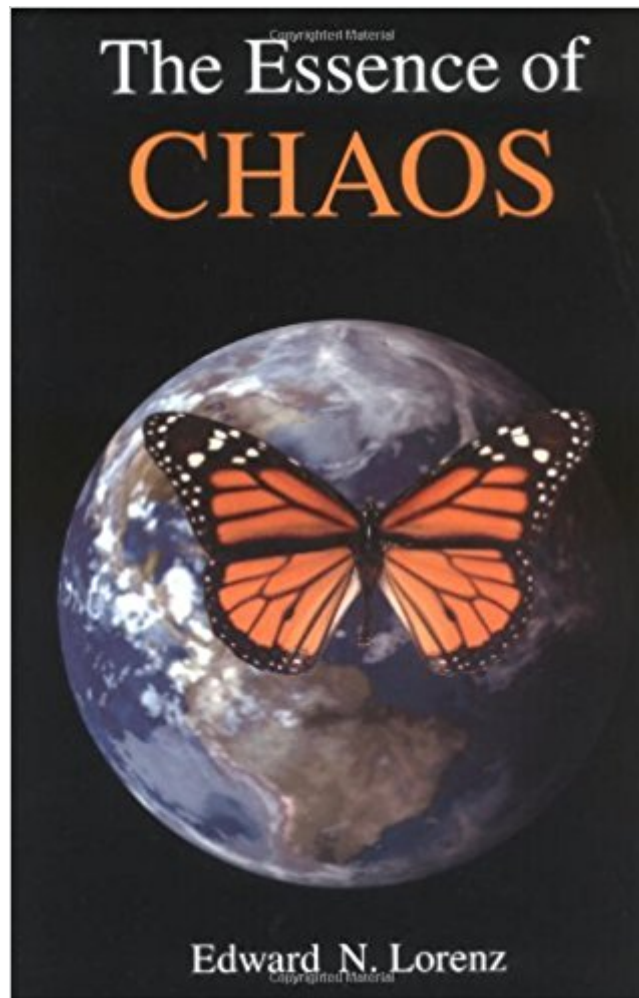




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# The Essence Of Chaos (Jessie And John Danz Lectures)



## Synopsis

The study of chaotic systems has become a major scientific pursuit in recent years, shedding light on the apparently random behaviour observed in fields as diverse as climatology and mechanics. In *The Essence of Chaos* Edward Lorenz, one of the founding fathers of Chaos and the originator of its seminal concept of the Butterfly Effect, presents his own landscape of our current understanding of the field. Lorenz presents everyday examples of chaotic behaviour, such as the toss of a coin, the pinball's path, the fall of a leaf, and explains in elementary mathematical terms how their essentially chaotic nature can be understood. His principal example involved the construction of a model of a board sliding down a ski slope. Through this model Lorenz illustrates chaotic phenomena and the related concepts of bifurcation and strange attractors. He also provides the context in which chaos can be related to the similarly emergent fields of nonlinearity, complexity and fractals. As an early pioneer of chaos, Lorenz also provides his own story of the human endeavour in developing this new field. He describes his initial encounters with chaos through his study of climate and introduces many of the personalities who contributed early breakthroughs. His seminal paper, "Does the Flap of a Butterfly's Wing in Brazil Set Off a Tornado in Texas?" is published for the first time.

## Book Information

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## Customer Reviews

"For the personal glimpses of chaos theory development alone, this book is worthwhile; for a clear, sharp development of the subject, the book is excellent; and for tying humanistic and scientific considerations together so well, there is a major debt owed to Lorenz." *—Geophysics* Lorenz

has produced a wonderfully accessible book on the ideas and story of chaos. The book is superbly written providing delightful intellectual entertainment." *Bulletin of the American Meteorological Society* "In giving a nontechnical but careful account of the field of dynamical systems and 'chaos,' and setting it in a broader scientific context, Lorenz has .. communicate[d] the nature of the mathematical sciences and how mathematics contributes to society." *SIAM Review* "[A] unique chronicle of the insights of one of the founding fathers of this still burgeoning field." *American Journal of Physics*

'For the personal glimpses of chaos theory development alone, this book is worth-while; for a clear, sharp development of the subject, the book is excellent; and for tying humanistic and scientific considerations together so well, there is a major debt owed to Lorenz.'--*Geophysics*

Chaos is not randomness and randomness is not chaos. Ed Lorenz, one of the founding fathers of chaos theory, has produced a book aimed at explaining chaos theory to the public, starting and ending on the same point- common usage has incorrectly rendered "chaotic" and "random" to be synonyms. Randomness implies that there are no equations to govern the evolution of a system, while chaos implies that the system is incredibly sensitive to its initial conditions, but there are equations behind the curtain. A pinball machine, flipping coins, tossing dice, and the global weather are all examples of chaotic systems, despite what your math teachers might have told you. Along the way you get a small dose of the history of the field and the relevant higher-level mathematics. Lorenz does, I think, a pretty good job of explaining the subject. The more mathematically inclined reader will find all the details and differential equations in the appendix of the book, but for the most part you do not need to have that much of a mathematical background to understand the main points of the book. Sometimes the explanations do get a little hairy, and might require a second read. Lorenz makes analogies with simple systems and everyday occurrences (such as a pinball machine and skiing down moguls) in engaging language mostly free of jargon. I would recommend this book if you are interesting in learning about the basics of chaos theory. I haven't yet read Gleick's famous *Chaos: Making a New Science*, but this seems like an excellent place to start.

If your interest in Chaos was piqued by Gleick's book on the subject, you may have found it unsatisfying. While it conveyed a enthusiasm for chaos, it only superficially answered questions about what characterizes a chaotic system. "The Essence of Chaos" is a much better book for

gaining an understanding of chaos, mainly because it includes a discussion of the mathematics. Both authors strive to avoid mathematics as much as possible, but in the end, I believe Lorenz achieves a better balance. He only touches lightly on the math, but without that, it's impossible to understand what makes a system chaotic. He doesn't quite go so far as to show a practical application of chaos theory, but a clear and concise example of that probably doesn't exist yet. But, he does achieve the goal of demonstrating and examining the fascinating characteristics of a chaotic system.

Having read several books about Chaos Theory, and having been promised a user-friendly and yet academic book on the subject, this book fell a little short. Certainly academic, not so easy for someone who does not have a solid background in the sciences and mathematics fields. The various sections cover much of the recent research, and if you can get past the equations, you get a more complete sense of the progression in the subject.

Interesting subject but of necessity complex. Still worth the read though.

This book exceeded my expectations, and the in-depth discussion of chaos theory and sensitive dependence on initial conditions was extremely intriguing.

thank you

It is for me a reference book. I keep going back to it and propose it to others. I could read it and understand although I am not an expert

good job

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