Fractals And Scaling In Finance 1st Edition

Modern Computing and Indigenous Design
Selfsimilar Processes
Discontinuity, Concentration, Risk. Selecta Volume E
Quantitative Finance for Physicists
Introduction to Econophysics
The Oxford Handbook of Computational Economics and Finance
Fractal Geometry and Dynamical Systems in Pure and Applied Mathematics: Fractals in pure mathematics
Fractals and Multifractals in Ecology and Aquatic Science
Fractal Geometry and Applications: Multifractals, probability and statistical mechanics, applications
Fractals and Chaos
Theory, Forecasting, and Pricing
Chaos and Order in the Capital Markets
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Wild Self-Affinity in Physics (1963–1976)
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Fractal Patterns in Nonlinear Dynamics and Applications
Applying Chaos Theory to Investment and Economics
The Mandelbrot Set and Beyond
Financial Modelling with Jump Processes
The Butterfly in the Quantum World
Multifractal Volatility
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Designing Portfolios and Managing Risk
The story of the most fascinating quantum fractal
Fractals and Scaling in Finance

Minutes from an Infinite Paradise
Fractals, Graphics, and Mathematics Education

PIPER CODY

Modern Computing and Indigenous Design World Scientific
Most books on fractals focus on deterministic fractals as the impact of incorporating randomness and time is almost absent. Further, most review fractals without explaining what scaling and self-similarity means. This book introduces the idea of scaling, self-similarity, scale-invariance and their role in the dimensional analysis. For the first time, fractals emphasizing mostly on stochastic fractal, and multifractals which evolves with time instead of scale-free self-similarity, are discussed. Moreover, it looks at power laws and dynamic scaling laws in some detail and provides an overview of modern statistical tools for calculating fractal dimension and multifractal spectrum.
Selfsimilar Processes American Mathematical Soc.
Fractals and Scaling in FinanceDiscontinuity, Concentration, Risk. Selecta Volume ESpringer Science & Business Media
Discontinuity, Concentration, Risk. Selecta Volume E Courier Corporation
Butterfly in the Quantum World by Indu Satija, with contributions by Douglas Hofstadter, is the first book ever to tell the story of the "Hofstadter butterfly", a beautiful and fascinating graph lying at the heart of the quantum theory of matter. The butterfly came out of a simple-sounding question: What happens if you immerse a crystal in a magnetic field? What energies can the electrons take on? From 1930 onwards, physicists struggled to answer this question, until 1974, when graduate student Douglas Hofstadter discovered that the answer was a graph consisting of nothing but copies of itself nested down infinitely many times. This wild mathematical object caught the physics world totally by surprise, and it continues to mesmerize physicists and mathematicians today. The butterfly plot is intimately related to many other important phenomena in number theory and physics, including Apollonian gaskets, the Foucault pendulum, quasicrystals, the quantum Hall effect, and many more. Its story reflects the magic, the mystery, and the simplicity of the laws of nature, and Indu Satija, in a wonderfully personal style, relates this story, enriching it with a vast number of lively historical anecdotes, many photographs, beautiful visual images, and even poems, making her book a great feast, for the eyes, for the mind and for the soul.
Quantitative Finance for Physicists Echo Point Books & Media, LLC
Mandelbrot is world famous for his creation of the new mathematics of fractal geometry. Yet few people know that his original field of applied research was in econometrics and financial models, applying ideas of scaling and self-similarity to arrays of data generated by financial analyses. This book brings together his original papers as well as many original chapters specifically written for this book.
Introduction to Econophysics Princeton University Press
A comprehensive, 1998 account of the practical aspects and pitfalls of the

applications of fractal modelling in the physical sciences.

The Oxford Handbook of Computational Economics and Finance Springer Science & Business Media

The scientific study of complex systems has transformed a wide range of disciplines in recent years, enabling researchers in both the natural and social sciences to model and predict phenomena as diverse as earthquakes, global warming, demographic patterns, financial crises, and the failure of materials. In this book, Didier Sornette boldly applies his varied experience in these areas to propose a simple, powerful, and general theory of how, why, and when stock markets crash. Most attempts to explain market failures seek to pinpoint triggering mechanisms that occur hours, days, or weeks before the collapse. Sornette proposes a radically different view: the underlying cause can be sought months and even years before the abrupt, catastrophic event in the build-up of cooperative speculation, which often translates into an accelerating rise of the market price, otherwise known as a "bubble." Anchoring his sophisticated, step-by-step analysis in leading-edge physical and statistical modeling techniques, he unearths remarkable insights and some predictions--among them, that the "end of the growth era" will occur around 2050. Sornette probes major historical precedents, from the decades-long "tulip mania" in the Netherlands that wilted suddenly in 1637 to the South Sea Bubble that ended with the first huge market crash in England in 1720, to the Great Crash of October 1929 and Black Monday in 1987, to cite just a few. He concludes that most explanations other than cooperative self-organization fail to account for the subtle bubbles by which the markets lay the groundwork for catastrophe. Any investor or investment professional who seeks a genuine understanding of looming financial disasters should read this book. Physicists, geologists, biologists, economists, and others will welcome Why Stock Markets Crash as a highly original "scientific tale," as Sornette aptly puts it, of the exciting and sometimes fearsome--but no longer quite so unfathomable--world of stock markets.

Fractal Geometry and Dynamical Systems in Pure and Applied Mathematics: Fractals in pure mathematics Elsevier

Ecologists sometimes have a less-than-rigorous background in quantitative methods, yet research within this broad field is becoming increasingly mathematical. Written in a step-by-step fashion, Fractals and Multifractals in Ecology and Aquatic Science provides scientists with a basic understanding of fractals and multifractals and the techniques for utilizing them when analyzing ecological phenomenon. With illustrations, tables, and graphs on virtually every page – several in color – this book is a comprehensive source of state-of-the-art ecological scaling and multiscaling methods at temporal and spatial scales, respectfully ranging from seconds to months and from millimeters to thousands of kilometers. It illustrates most of the data analysis techniques with real case studies often based on original findings. It also incorporates descriptions of current and new numerical techniques to analyze and deepen understanding of ecological situations and their solutions. Includes a Wealth of Applications and Examples This book also includes nonlinear analysis techniques and the application

of concepts from chaos theory to problems of spatial and temporal patterns in ecological systems. Unlike other books on the subject, Fractals and Multifractals in Ecology and Aquatic Science is readily accessible to researchers in a variety of fields, such as microbiology, biology, ecology, hydrology, geology, oceanography, social sciences, and finance, regardless of their mathematical backgrounds. This volume demystifies the mathematical methods, many of which are often regarded as too complex, and allows the reader to access new and promising concepts, procedures, and related results.

Fractals and Multifractals in Ecology and Aquatic Science American Mathematical Soc.

This fascinating book explores the connections between chaos theory, physics, biology, and mathematics. Its award-winning computer graphics, optical illusions, and games illustrate the concept of self-similarity, a typical property of fractals. The author - hailed by Publishers Weekly as a modern Lewis Carroll - conveys memorable insights in the form of puns and puzzles. 1992 edition.

Fractal Geometry and Applications: Multifractals, probability and statistical mechanics, applications Springer

This new book uses advanced signal processing technology to measure and analyze risk phenomena of the financial markets. It explains how to scientifically measure, analyze and manage non-stationarity and long-term time dependence (long memory) of financial market returns. It studies, in particular, financial crises in persistent financial markets, such as stock, bond and real estate market, and turbulence in antipersistent financial markets, such as anchor currency markets. It uses Windowed Fourier and Wavelet Multiresolution Analysis to measure the degrees of persistence of these complex markets, by computing monofractal Hurst exponents and multifractal singularity spectra. It explains how and why financial crises and financial turbulence may occur in the various markets and why we may have to reconsider the current wave of term structure modeling based on affine models. It also uses these persistence measurements to improve the financial risk management of global investment funds, via numerical simulations of the nonlinear diffusion equations describing the underlying high frequency dynamic pricing processes.

Fractals and Chaos Public Affairs

The book contributes to their development and will therefore be of use in diverse scientific communities."--BOOK JACKET.

Theory, Forecasting, and Pricing CRC Press

Fractals are characterized by the repetition of similar patterns at ever-diminishing scales. Fractal geometry has emerged as one of the most exciting frontiers on the border between mathematics and information technology and can be seen in many of the swirling patterns produced by computer graphics. It has become a new tool for modeling in biology, geology, and other natural sciences. Anthropologists have observed that the patterns produced in different cultures can be characterized by specific design themes. In Europe and America, we often see cities laid out in a grid pattern of straight streets and right-angle corners. In contrast, traditional African settlements tend to use fractal structures-circles of circles of circular

dwellings, rectangular walls enclosing ever-smaller rectangles, and streets in which broad avenues branch down to tiny footpaths with striking geometric repetition. These indigenous fractals are not limited to architecture; their recursive patterns echo throughout many disparate African designs and knowledge systems. Drawing on interviews with African designers, artists, and scientists, Ron Eglash investigates fractals in African architecture, traditional hairstyling, textiles, sculpture, painting, carving, metalwork, religion, games, practical craft, quantitative techniques, and symbolic systems. He also examines the political and social implications of the existence of African fractal geometry. His book makes a unique contribution to the study of mathematics, African culture, anthropology, and computer simulations.

Chaos and Order in the Capital Markets
Cambridge University Press
A leading pioneer in the field offers practical applications of this innovative science. Peters describes complex concepts in an easy-to-follow manner for the non-mathematician. He uses fractals, rescaled range analysis and nonlinear dynamical models to explain behavior and understand price movements. These are specific tools employed by chaos scientists to map and measure physical and now, economic phenomena.

Complex Webs in Nature and Technology
CRC Press
Mandelbrot is world famous for his creation of the new mathematics of fractal geometry. Yet few people know that his original field of applied research was in econometrics and financial models, applying ideas of scaling and self-similarity to arrays of data generated by financial analyses. This book brings together his original papers as well as many original chapters specifically written for this book.

Fractals and Scaling in Finance
Routledge
A variety of different social, natural and technological systems can be described by the same mathematical framework. This holds from the Internet to food webs and to boards of company directors. In all these situations a graph of the elements of the system and their interconnections displays a universal feature. There are only few elements with many connections, and many elements with few connections. This book presents the experimental evidence of these "Scale-free networks" and provides students and researchers with a corpus of theoretical results and algorithms to analyse and understand these features. The content of this book and the exposition makes it a clear textbook for beginners, and a reference book for the experts.

Wild Self-Affinity in Physics (1963–1976) Oxford University Press
In an ever-changing economy, market specialists strive to find new ways to evaluate the risks and potential reward of economic ventures. They start by assessing the importance of human reaction during the economic planning process and put together systems to measure financial markets and their longevity. Fractal Approaches for Modeling Financial Assets and Predicting Crises is a critical scholarly resource that examines the fractal structure and long-term memory of the financial markets in order to predict prices of financial assets and financial crises. Featuring coverage on a broad range of topics, such as computational process models, chaos theory, and game theory, this book is geared towards academicians, researchers, and students seeking

current research on pricing and predicting financial crises.
Discontinuity, Concentration, Risk. Selecta Volume E John Wiley & Sons
Muscular Portfolios is here to change the investing game — and help you leave stress behind with a stronger, smarter approach to investing. For decades, the financial services industry has sold risky investments, claiming that this was the only path to large gains. But this strategy is highly vulnerable to big losses that can devastate your portfolio. Today, there's a better approach. It combines the latest academic research in finance with the new ultra-low-cost index funds (exchange-traded funds). The result is an approach that provides market-like returns with dramatically smaller losses and requires only 15 minutes a month or less. Muscular Portfolios lays out the basic principles of this kind of investing so you can manage your own money successfully — without turning it into your second job. Investigative journalist Brian Livingston takes you behind the curtain of Wall Street and lays out a game-changing approach to investing: Muscular Portfolios, which are easy-to-use financial strategies you can set up yourself, even if you have no investment experience at all. Filled with helpful illustrations, compelling evidence, and simple, no-nonsense instructions, Muscular Portfolios is a resource, not a sales pitch. There are no financial products to buy, no secret formula to pay for. Everything is fully disclosed in bite-sized steps — and on a totally free website — that you can start using today to grow your wealth. Driven by cutting-edge investment research and backed by extensive market testing, Muscular Portfolios will revolutionize investing for families and individual investors.

Fractal Patterns in Nonlinear Dynamics and Applications Academic Press
This volume offers an excellent selection of cutting-edge articles about fractal geometry, covering the great breadth of mathematics and related areas touched by this subject. Included are rich survey articles and fine expository papers. The high-quality contributions to the volume by well-known researchers--including two articles by Mandelbrot--provide a solid cross-section of recent research representing the richness and variety of contemporary advances in and around fractal geometry. In demonstrating the vitality and diversity of the field, this book will motivate further investigation into the many open problems and inspire future research directions. It is suitable for graduate students and researchers interested in fractal geometry and its applications. This is a two-part volume. Part 1 covers analysis, number theory, and dynamical systems; Part 2, multifractals, probability and statistical mechanics, and applications.
Applying Chaos Theory to Investment and Economics Fractals and Scaling in FinanceDiscontinuity, Concentration, Risk. Selecta Volume E
A fresh approach to managing risk in the most challenging market conditions Strategic Risk Management presents an innovative approach to portfolio design. Often the risk management function is a series of tripwires that are activated after the portfolio is already in trouble. Strategic Risk Management presents a framework that seeks to integrate the initial portfolio design and the risk management function. Much of the book’s research was conducted pre-COVID-19; the market selloff in March 2020 offers a unique out of sample experiment that provides evidence supportive of the approach. A crucial

ingredient in this integrative design is to understand the performance of various investment strategies in stressful market conditions. The book begins by measuring the performance of various assets and strategies that purport to provide hedging abilities: such as put options and long gold positions. While put options are an extremely reliable, few would want to give up 700 basis points a year to buy this type of insurance. And even if gold does not have the type of drag that long options strategies do, gold turns out to be an unreliable hedge. We focus on two investments that historically offer impressive protection in adverse events: trend following strategies and quality-based equity strategies. We show that performance of trend following strategies is naturally linked to the payoff of a long call and long put position. This property is particularly useful in mitigating portfolio drawdowns. The book also considers operational strategies such as portfolio rebalancing. Most investors routinely rebalance their portfolios, for example, to a 60/40 equity/bond mix. However, few investors realize that a mechanical rebalancing strategy increases drawdowns and portfolio risk. The reason is simple. In extended equity sell offs, the rebalancing strategy is to buy, which increases drawdowns. Strategic Risk Management offers an intuitive solution. If the trend following signal suggests that the drawdown will continue, delay the rebalancing. We call this strategic rebalancing. The book contains various other insights, including analyzing the impact of a portfolio strategy that targets a certain risk level. This technique reduces allocations to the riskiest assets when volatility spikes. Given that surges in volatility are usually associated with plunging markets, this strategy also reduces drawdowns. The reader of this book will: Learn how to incorporate risk management into the core portfolio design, rather than treating it as an afterthought; Gain a deeper understanding of concepts such as portfolio rebalancing; Acquire tools to achieve a more balanced return stream through volatility targeting of higher-risk asset classes; Obtain an overview of various defensive strategies, and learn which strategies offer the most reliable and affordable protection; Be equipped with a set of rules that allows for the early detection of strategies or managers that have faded. Strategic Risk Management is a thought-provoking resource for developing your portfolio design and risk management skills.

The Mandelbrot Set and Beyond Springer

"A Legendary financier on the perils of greed and the mysteries of the market" (Cover).

Financial Modelling with Jump Processes Profile Books

Many natural objects have been found to be fractal and fractal mathematics has been used to generate many beautiful ?nature? scenes. Fractal mathematics is used in image compression and for movies and is now becoming an engineering tool as well. This book describes the application of fractal mathematics to one engineering specialty ? reservoir engineering. This is the process of engineering the production of oil and gas. The reservoir engineer's job is to design and predict production from underground oil and gas reservoirs. The successful application of fractal mathematics to this engineering discipline should be of interest, not only to reservoir engineers, but to other engineers with their own potential applications as well. Geologists will find

surprisingly good numerical descriptions of subsurface rock distributions. Physicists will be interested in the application of renormalization and percolation theory described in the book. Geophysicists will find the description of fluid flow scaling problems faced by the reservoir engineer similar to their problems of scaling the transport of acoustic signals.

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