

A Very Brief Introduction To Generalized Estimating Equations

How many possible sudoku puzzles are there? In the lottery, what is the chance that two winning balls have consecutive numbers? Who invented Pascal's triangle? (it was not Pascal) Combinatorics, the branch of mathematics concerned with selecting, arranging, and listing or counting collections of objects, works to answer all these questions. Dating back some 3000 years, and initially consisting mainly of the study of permutations and combinations, its scope has broadened to include topics such as graph theory, partitions of numbers, block designs, design of codes, and latin squares. In this Very Short Introduction Robin Wilson gives an overview of the field and its applications in mathematics and computer theory, considering problems from the shortest routes covering certain stops to the minimum number of colours needed to colour a map with different colours for neighbouring countries. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Preface -- Introduction: what is critical theory? -- The frankfurt school -- A matter of method -- Critical theory and modernism -- Alienation and reification -- Enlightened illusions -- The utopian laboratory -- The happy consciousness -- The great refusal -- From resignation to renewal -- Unfinished tasks -- Further reading -- Index

Simon Blackburn tackles the major moral questions surrounding birth, death, happiness, desire, and freedom, and considers how we should think about the meaning of life. This new edition highlights the importance of an understanding of approaches to ethics and its foundations, and how this relates to our modern world of eroding trust.

Games are everywhere: Drivers maneuvering in heavy traffic are playing a driving game. Bargain hunters bidding on eBay are playing an auctioning game. The supermarket's price for corn flakes is decided by playing an economic game. This Very Short Introduction offers a succinct tour of the fascinating world of game theory, a ground-breaking field that analyzes how to play games in a rational way. Ken Binmore, a renowned game theorist, explains the theory in a way that is both entertaining and non-mathematical yet also deeply insightful, revealing how game theory can shed light on everything from social gatherings, to ethical decision-making, to successful card-playing strategies, to calculating the sex ratio among bees. With mini-biographies of many fascinating, and occasionally eccentric, founders of the subject--including John Nash, subject of the movie *A Beautiful Mind*--this book offers a concise overview of a cutting-edge field that has seen spectacular successes in evolutionary biology and economics, and is beginning to revolutionize other disciplines from psychology to political science. About the Series: Oxford's Very Short Introductions offers concise and original introductions to a wide range of subjects--from Islam to Sociology, Politics to Classics, and Literary Theory to History. Not simply a textbook of definitions, each volume provides trenchant and provocative--yet always balanced and complete--discussions of the central issues in a given topic. Every Very Short Introduction gives a readable evolution of the subject in question, demonstrating how it has developed and influenced society. Whatever the area of study, whatever the topic that fascinates the reader, the series has a handy and affordable guide that will likely prove indispensable. Starting with an examination of how historians work, this "Very Short Introduction" aims to explore history in a general, pithy, and accessible manner, rather than to delve into specific periods.

« For thirty years, Linda Greenhouse, the Pulitzer Prize-winning author of *The U.S. Supreme Court: A Very Short Introduction*, chronicled the activities of the justices as the Supreme Court correspondent for the *New York Times*. In this concise volume, she draws on her deep knowledge of the court's history as well as of its written and unwritten rules to show the reader how the Supreme Court really works. »--

Despite a long history of external threats and internal strife, the Roman Catholic Church remains a vast and influential presence in our modern world. But what were its origins, and how has it changed and adapted over the centuries? After Pope Benedict XVI dramatically resigned in early 2013 (the first Pope to resign since the fifteenth century), and Pope Francis was elected, many wondered what direction he would lead the Church in, and whether the Church could modernise in the face of the demands of our world. In this Very Short Introduction, Gerald O'Collins covers the history of the Catholic Church, and considers some of the key issues facing Catholicism today, such as the catastrophic revelations about clerical child abuse, the impact of the growth of Islam, and the destruction in the Middle East of ancient Christian church communities. He also shows how Catholics are being increasingly challenged by an opposition between their traditional Christian values and rights which are endorsed by the secular world, such as the right to physician assisted suicide or same-sex marriage, and considers the future for the largest and oldest institution in the world. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Throughout history plague has been the cause of many major catastrophes. It was responsible for the Black Death of 1348 and the Great Plague of London in 1665, and for devastating epidemics much earlier and much later, in the Mediterranean in the sixth century, and in China and India between the 1890s and 1920s. Today, it has become a metaphor for other epidemic disasters which appear to threaten us, but plague itself has never been eradicated. In this Very Short Introduction, Paul Slack explores the historical impact of plague over the centuries, looking at the ways in which it has been interpreted, and the powerful images it has left behind in art and literature. Examining what plague meant for those who suffered from it, and how governments began to fight against it, he demonstrates the impact plague has had on modern notions of public health and how it has shaped our history. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable. From the beginning of time, humans have been driven by both a fear of the unknown and a curiosity to know. We have always yearned to know what lies ahead, whether threat or safety, scarcity or abundance. Throughout human history, our forebears tried to create certainty in the unknown, by seeking to influence outcomes with sacrifices to gods, preparing for the unexpected with advice from oracles, and by reading the stars through astrology. As scientific methods improve and computer technology develops we become ever more confident of our capacity to predict and quantify the future by accumulating and interpreting patterns from the past, yet the truth is there is still no certainty to be had. In this Very Short Introduction Jennifer Gidley considers some of our

most burning questions: What is -the future?- Is the future a time yet to come? Or is it a utopian place? Does the future have a history? Is there only one future or are there many possible futures? She asks if the future can ever be truly predicted or if we create our own futures -both hoped for and feared - by our thoughts, feelings, and actions, and concludes by analyzing how we can learn to study the future. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

An exploration of the concept of "nothing" journeys from ancient ideas and cultural traditions to the latest scientific research, discussing the history of the vacuum, theories on the nature of time and space, and other discoveries.

Introduction; 1 The information revolution; 2 The language of information; 3 Mathematical information; 4 Semantic information; 5 Physical information; 6 Biological information; 7 Economic information; 8 The ethics of information; Conclusion; References.

Examines the origins of life on Earth and the search for extraterrestrial life, through an understanding of the factors that have allowed life to exist on this planet and the commonalities on others that may enable life elsewhere.

Chaos exists in systems all around us. Even the simplest system of cause and effect can be subject to chaos, denying us accurate predictions of its behaviour, and sometimes giving rise to astonishing structures of large-scale order. Our growing understanding of Chaos Theory is having fascinating applications in the real world - from technology to global warming, politics, human behaviour, and even gambling on the stock market. Leonard Smith shows that we all have an intuitive understanding of chaotic systems. He uses accessible maths and physics (replacing complex equations with simple examples like pendulums, railway lines, and tossing coins) to explain the theory, and points to numerous examples in philosophy and literature (Edgar Allen Poe, Chang-Tzu, Arthur Conan Doyle) that illuminate the problems. The beauty of fractal patterns and their relation to chaos, as well as the history of chaos, and its uses in the real world and implications for the philosophy of science are all discussed in this Very Short Introduction. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Physics, the fundamental science of matter and energy, encompasses all levels of nature from the subatomic to the cosmic, and underlies much of the technology around us. Understanding the physics of our universe is an essential aspect of humanity's quest to understand our environment and our place within it. Doing physics enables us to explore the interaction between environment and human society, and can help us to work towards the future sustainability of the planet. This Very Short Introduction provides an overview of how this pervasive science came to be and how it works: who funds it, how physicists are trained and how they think, and how physics supports the technology we all use. Sidney Perkowitz presents the theories and outcomes of pure and applied physics from ideas of the Greek natural philosophers to modern quantum mechanics, cosmology, digital electronics and energy production. Considering its most consequential experiments, including recent results in elementary particles, gravitational waves and materials science, he also discusses outside the lab, the effects of physics on society, culture, and humanity's vision of its place in the universe. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Consciousness, 'the last great mystery for science', remains a hot topic. How can a physical brain create our experience of the world? What creates our identity? Do we really have free will? Could consciousness itself be an illusion? Exciting new developments in brain science are continuing the debates on these issues, and the field has now expanded to include biologists, neuroscientists, psychologists, and philosophers. This controversial book clarifies the potentially confusing arguments, and the major theories, whilst also outlining the amazing pace of discoveries in neuroscience. Covering areas such as the construction of self in the brain, mechanisms of attention, the neural correlates of consciousness, and the physiology of altered states of consciousness, Susan Blackmore highlights our latest findings. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Introduces readers to the basic properties of light -reflection and refraction, polarization, and interference- before moving on to how light is generated, its role in relativity, and quantum effects it exhibits.

Risk is everywhere - from genetically modified crops, dams, and stem-cell therapy to heartbreak, online predators, inflation, and robbery. This Very Short Introduction examines what science has learned about how people deal with risks, what we can learn through decision theory, and how we can evaluate risk in our own lives.

This is a non-technical introduction to the main issues and findings in current brain research. It gives a sense of how neuroscience addresses questions about the relationship between the brain, and thought, memories, perceptions, and actions. Covering the details of brain science in an accessible style, it includes up to date coverage of developments of brain research, and suggests directions future research might take.

The Brain also integrates discussion of the more familiar implications of the brain's actions, such as memories, perceptions, and motor control. Contents: Mind and brain: what's the problem? Let's get physical Sight, sound, and imagination Last week's potatoes! Perception to action Altered states of mind Where do we go from here?

"Fully updated new edition"--Label on cover.

Causation is the most fundamental connection in the universe. Without it, there would be no science or technology. There would be no moral responsibility either, as none of our thoughts would be connected with our actions and none of our actions with any consequences. Nor would we have a system of law because blame resides only in someone having caused injury or damage. Any intervention we make in the world around us is premised on there being causal connections that are, to a degree, predictable. It is causation that is at the basis of prediction and also explanation. This Very Short Introduction introduces the key theories of causation and also the surrounding debates and controversies. Do causes produce their effects by guaranteeing them? Do causes have to precede their effects? Can causation be reduced to the forces of physics? And are we right to think of causation as one single thing at all? ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

More than one hundred and fifty years after the Civil War began, its hold on the American imagination has not abated. This Very Short Introduction offers a concise history of the era and serves as a necessary introduction to dramatic events that fundamentally reshaped the nation.

Nothing: A Very Short Introduction Oxford University Press

International relations affects everyone's lives: their security, economic well-being, rights and freedoms, and the environment they share.

Recently we have seen the transformation from a world of empires to today's world of sovereign states, which are enmeshed in a complex

array of international institutions, all exercising degrees of political authority. The new global organization of political authority has far-reaching consequences. This Very Short Introduction untangles this complex world, providing an accessible framework for understanding the contours of global political change. Christian Reus-Smit treats theory as an indispensable tool for grasping international relations, but demystifies theorizing, introducing it as an everyday human practice. He surveys a range of theories, from realism to feminism: reading them as contrasting perspectives on the global organization of political authority. Historically, such organization has been shaped by diverse social forces, four of which are discussed in detail: shifting patterns of warfare, changing economic conditions, struggles for rights, and the politics of culture. Reus-Smit concludes with a reflection on the future of international relations in an era of profound global change. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Very Short Introductions: Brilliant, Sharp, Inspiring Arbitration is a legal dispute resolution mechanism, alternative to courts. It provides binding decisions, enforceable around the world. It is where parties take their disputes when they have agreed that courts, for one reason or another, do not suit them - which happens more often than one might think. Some of the most politically sensitive disputes on the largest scale go to arbitration. Countries which need to settle their boundaries in areas of the oceans rich in oil, gas and other resources sometimes arbitrate, and much of the war in Sudan was eventually tied up with an arbitration. Investors who have staked billions of dollars in unstable developing countries rely on arbitration clauses to protect their investments. But also much smaller, everyday cases are routinely dealt with by arbitration - millions of consumers, whether they know it or not, enter into arbitration contracts when they conclude routine transactions. Even athletes get involved in arbitration cases of great notoriety, for instance when these relate to doping offences during the Olympic Games. This Very Short Introduction explains what arbitration is, how it works, what parties who have agreed to go to arbitration should expect, the relationship between arbitration and the law, and the politics of arbitration. It also considers where the global system of arbitration is headed. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Superconductivity is one of the most exciting areas of research in physics today. Outlining the history of its discovery, and the race to understand its many mysterious phenomena, this Very Short Introduction also explores the deep implications of the theory, and its potential to revolutionize the physics and technology of the future.

From the schools of ancient times to the present day, Gary Thomas looks at how and why education evolved as it has. By exploring some of the big questions, he examines the ways in which schools work, considers the differences around the world, and concludes by considering the future of education worldwide.

Explores the discovery, nature, and role of genes in evolution and development.

Simon Critchley's Very Short Introduction shows that Continental philosophy encompasses a distinct set of philosophical traditions and practices, with a compelling range of problems all too often ignored by the analytic tradition. He discusses the ideas and approaches of philosophers such as Kant, Hegel, Nietzsche, Husserl, Heidegger, Sartre, Habermas, Foucault, and Derrida, and introduces key concepts such as existentialism, nihilism, and phenomenology by explaining their place in the Continental tradition.

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This introduction to Plato focuses on the philosophy and argument of his writings, drawing the reader into Plato's way of doing philosophy, and the general themes of his thinking. It includes a brief account of Plato's life.

Logic is often perceived as having little to do with the rest of philosophy, and even less to do with real life. Graham Priest explores the philosophical roots of the subject, explaining how modern formal logic addresses many issues.

This Very Short Introduction outlines the nature of public health in our world today and places public health in its historical context from the earliest times, analysing in particular the changes in public health regulation through the nineteenth century and the twentieth and twenty first centuries.

This book is a clear and informative introduction to cryptography and data protection - subjects of considerable social and political importance. It explains what algorithms do, how they are used, the risks associated with using them, and why governments should be concerned. Important areas are highlighted, such as Stream Ciphers, block ciphers, public key algorithms, digital signatures, and applications such as e-commerce. This book highlights the explosive impact of cryptography on modern society, with, for example, the evolution of the internet and the introduction of more sophisticated banking methods. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Linguistics falls in the gap between arts and science, on the edges of which the most fascinating discoveries and the most important problems are found. Beginning at the 'arts' end of the subject with the common origins of languages, and finishing at the 'science' end with the newest discoveries regarding language in the brain, this stimulating guide covers all the major aspects of linguistics from a refreshing and insightful angle.

Without cause and effect, there would be no science or technology, no moral responsibility, and no system of law. Causation is therefore the most fundamental connection in the universe and a core topic of philosophical thought. This Very Short Introduction introduces all of the main theories of causation and its key debates.

Law underlies our society - it protects our rights, imposes duties on each of us, and establishes a framework for the conduct of almost every social, political, and economic activity. The punishment of crime, compensation of the injured, and the enforcement of contracts are merely some of the tasks of a modern legal system. It also strives to achieve justice, promote freedom, and protect our security. The result is a system that, while it touches all of our daily lives, is properly understood by only a few, with its impenetrable jargon, obsolete procedures, and interminable stream of Byzantine statutes and judgments of the courts. This clear, jargon-free Very Short Introduction aims to redress that balance, as it introduces the essentials of law and legal systems in a lively, accessible, and stimulating manner. Explaining the main concepts, terms, and processes of the legal system, it focuses on the Western tradition (the common law and the civil law), but also includes discussions of other legal systems, such as customary law and Islamic law. And it looks to the future too, as globalization and rapid advances in technology place increasing strain on our current legal system. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our

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Discusses the basic components of computers; how increasingly miniature parts have led to products, applications, and networks that solve problems; the issues that increased connectivity has produced; and some of the emerging technologies in the field.

The United Nations has been called everything from "the best hope of mankind" to "irrelevant" and "obsolete." In this concise overview, Jussi Hanhimaki sheds light on the current debate over the UN's effectiveness as he provides a clear understanding of how it was originally conceived, how it has come to its present form, and how it must confront new challenges in a rapidly changing world. After a brief history of the UN, the author examines its successes and failures as a guardian of international peace and security, as a promoter of human rights, as a protector of international law, and as an engineer of socioeconomic development.

In this Very Short Introduction, John Holland presents an introduction to the science of complexity. Using examples from biology and economics, he shows how complexity science models the behaviour of complex systems.

What is knowledge? Is it the same as opinion or truth? Do you need to be able to justify a claim in order to count as knowing it? How can we know that the outer world is real and not a dream? Questions like these have existed since ancient times, and the branch of philosophy dedicated to answering them - epistemology - has been active for thousands of years. In this thought-provoking Very Short Introduction, Jennifer Nagel considers the central problems and paradoxes in the theory of knowledge and draws attention to the ways in which philosophers and theorists have responded to them. By exploring the relationship between knowledge and truth, and considering the problem of scepticism, Nagel introduces a series of influential historical and contemporary theories of knowledge, incorporating methods from logic, linguistics, and psychology, using a number of everyday examples to demonstrate the key issues and debates. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Franz Kafka is one of the most intriguing writers of the 20th century. In this text the author provides an up-to-date introduction to Kafka, beginning with an examination of his life and then discussing some of the major themes that emerge in Kafka's work.

The era known as Reconstruction is one of the unhappiest times in American history. It succeeded in reuniting the nation politically after the Civil War but in little else. Among its chief failures was the inability to chart a progressive course for race relations after the abolition of slavery and rise of Jim Crow. Reconstruction also struggled to successfully manage the Southern resistance towards a Northern, free-labor pattern. But the failures cannot obscure a number of notable accomplishments, with decisive long-term consequences for American life: the 14th and 15th Amendments to the Constitution, the election of the first African American representatives to the US Congress, and the avoidance of any renewed outbreak of civil war. Reconstruction suffered from poor leadership and uncertainty of direction, but it also laid the groundwork for renewed struggles for racial equality during the Civil Rights Movement. This Very Short Introduction delves into the constitutional, political, and social issues behind Reconstruction to provide a lucid and original account of a historical moment that left an indelible mark on American social fabric. Award-winning historian Allen C. Guelzo depicts Reconstruction as a "bourgeois revolution" -- as the attempted extension of the free-labor ideology embodied by Lincoln and the Republican Party to what was perceived as a Southern region gone astray from the Founders' intention in the pursuit of Romantic aristocracy. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

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