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A comprehensive introduction to reliability analysis. The first section provides a thorough but elementary prologue to reliability theory. The latter half comprises more advanced analytical tools including Markov processes, renewal theory, life data analysis, accelerated life testing and Bayesian reliability analysis. Features numerous worked examples. Each chapter concludes with a selection of problems plus additional material on applications. Reliability analysis is concerned with the analysis of devices and systems whose individual components are prone to failure. This textbook presents an introduction to reliability analysis of repairable and non-repairable systems. It is based on courses given to both undergraduate and graduate students of engineering and statistics as well as in workshops for professional engineers and scientists. As a result, the book

concentrates on the methodology of the subject and on understanding theoretical results rather than on its theoretical development. An intrinsic aspect of reliability analysis is that the failure of components is best modelled using techniques drawn from probability and statistics. Professor Zacks covers all the basic concepts required from these subjects and covers the main modern reliability analysis techniques thoroughly. These include: the graphical analysis of life data, maximum likelihood estimation and bayesian likelihood estimation. Throughout the emphasis is on the practicalities of the subject with numerous examples drawn from industrial and engineering settings. This complete resource on the theory and applications of reliability engineering, probabilistic models and risk analysis consolidates all the latest research, presenting the most up-to-date developments in this field. With comprehensive coverage of the theoretical and practical issues of both classic and modern topics, it also provides a unique commemoration to the centennial of the birth of Boris Gnedenko, one of the most prominent reliability scientists of the twentieth century. Key features include: expert treatment of probabilistic models and statistical inference from leading scientists, researchers and practitioners in their respective reliability fields detailed coverage of multi-state system reliability, maintenance models, statistical inference in reliability, systemability, physics of failures and reliability demonstration many examples and engineering case studies to illustrate the theoretical results and their practical applications in industry Applied Reliability Engineering and Risk Analysis is one of the first works to treat the important areas of degradation analysis, multi-state system reliability, networks and large-scale systems in one comprehensive volume. It is an essential reference for engineers and scientists involved in reliability analysis, applied probability and statistics, reliability engineering and maintenance, logistics, and quality control. It is also a useful resource for graduate students specialising in reliability analysis and applied probability and statistics. Dedicated to the Centennial of the birth of Boris Gnedenko, renowned Russian mathematician and reliability theorist Probabilistic models; Basic statistical inference; The exponential distribution; The weibull distribution; The gamma distribution; Extreme-value distribution; The logistic and other distribution; Goodness-of-fit tests. This book presents the latest developments and breakthroughs in fuzzy theory and performance prediction of queuing and reliability models by using the stochastic modeling and optimization theory. The main focus is on analytics that use fuzzy logic, queuing and reliability theory for the performance prediction and optimal design of real-time engineering systems including call centers, telecommunication, manufacturing, service organizations, etc. For the day-to-day as well as industrial queuing situations and reliability prediction of machining parts embedded in computer, communication and manufacturing systems, the book assesses various measures of performance and effectiveness that can provide valuable insights and help arrive at the best decisions with regard to service and engineering systems. In twenty chapters, the book presents both theoretical developments and applications of the fuzzy logic, reliability and queuing models in a diverse range of scenarios. The topics discussed will be of interest to researchers, educators and undergraduate students in the fields of Engineering, Business Management, and the Mathematical Sciences. "Reliability theory and applications become major concerns of engineers and managers engaged in making high quality products and designing highly reliable systems. This book aims to survey new research topics in reliability theory and useful applied techniques in reliability engineering." "The reader will learn new topics and techniques, and how to apply reliability models to actual ones. The book will serve as an essential guide to a subject of study for graduate students and researchers and as a useful guide for reliability engineers engaged not only in maintenance work but also in management and computer works." -- Book Jacket. Offers timely and comprehensive coverage of dynamic system reliability theory This book focuses on hot issues of dynamic system reliability, systematically introducing the reliability modeling and analysis methods for systems with imperfect fault coverage, systems with function dependence, systems subject to deterministic or probabilistic common-cause failures, systems subject to deterministic or probabilistic competing failures, and dynamic standby sparing systems. It presents recent developments of such extensions involving reliability modelling theory, reliability evaluation methods, and features numerous case studies based on real-world examples. The presented dynamic reliability theory can enable a more accurate representation of actual complex system behavior, thus more effectively guiding the reliable design of real-world critical systems. Dynamic System Reliability: Modelling and Analysis of Dynamic and Dependent Behaviors begins by describing the evolution from the traditional static reliability theory to the dynamic system reliability theory, and provides a detailed investigation of dynamic and dependent behaviors in subsequent chapters. Although written for those with a background in basic probability theory and stochastic processes, the book includes a chapter reviewing the fundamentals that readers need to know in order to understand contents of other chapters which cover advanced topics in reliability theory and case studies. The first book systematically focusing on dynamic system reliability modelling and analysis theory Provides a comprehensive treatment on imperfect fault coverage (single-level/multi-level or modular), function dependence, common cause failures (deterministic and probabilistic), competing failures (deterministic and probabilistic), and dynamic standby sparing Includes abundant illustrative examples and case studies based on real-world systems Covers recent advances in combinatorial models and algorithms for dynamic system reliability analysis Offers a rich set of references, providing helpful resources for readers to pursue further research and study of the topics Dynamic System Reliability: Modelling and Analysis of Dynamic and Dependent Behaviors is an excellent book for undergraduate and graduate students, and engineers and researchers in reliability and related disciplines. The material in this book was first presented as a one-semester course in Reliability Theory and Preventive Maintenance for M.Sc. students of the Industrial Engineering Department of Ben Gurion University in the 1997/98 and 1998/99 academic years. Engineering students are mainly interested in the applied part of this theory. The value of preventive maintenance theory lies in the possibility of its implementation, which crucially depends on how we handle statistical reliability data. The very nature of the object of reliability theory - system lifetime - makes it extremely difficult to collect large amounts of data. The data available are usually incomplete, e.g. heavily censored. Thus, the desire to make the course material more applicable led me to include in the course topics such as modeling system lifetime distributions (Chaps. 1,2) and the maximum likelihood techniques for lifetime data processing (Chap. 3). A course in the theory of statistics is a prerequisite for these lectures. Standard courses usually pay very little attention to the techniques needed for our purpose. A short summary of them is given in Chap. 3, including widely used probability plotting. Chapter 4 describes the most useful and popular models of preventive maintenance and replacement. Some practical aspects of applying these models are addressed, such as treating uncertainty in the data, the role of data contamination and the opportunistic scheduling of maintenance activities. In recent years, substantial efforts are being made in the development of reliability theory including fuzzy reliability theories and their applications to various real-life problems. Fuzzy set theory is widely used in decision making and multi criteria such as management and engineering, as well as other important domains in order to evaluate the uncertainty of real-life systems. Fuzzy reliability has proven to have effective tools and techniques based on real set theory for proposed models within various engineering fields, and current research focuses on these applications. Advancements in Fuzzy Reliability Theory introduces the concept of reliability fuzzy set theory including various methods, techniques, and algorithms. The chapters present the latest findings and research in fuzzy reliability theory applications in engineering areas. While examining the implementation of fuzzy reliability theory among various industries such as mining, construction, automobile, engineering, and more, this book is ideal for engineers, practitioners, researchers, academicians, and students interested in fuzzy reliability theory applications in engineering areas. This comprehensive text discusses engineering reliability theory and associated quantitative analytical methods and directly addresses design concepts for improved reliability. It includes such topics as failure data banks, robots, transit systems, equipment replacement, and human errors. This book will prove useful to researchers and technical managers, as well as graduate students of aeronautical, mechanical, and structural engineering. Recent Advances in System Reliability Engineering describes and evaluates the latest tools, techniques, strategies, and methods in this topic for a variety of applications. Special emphasis is put on simulation and modelling technology which is growing in influence in industry, and presents challenges as well as opportunities to reliability and systems engineers. Several manufacturing engineering applications are addressed, making this a particularly valuable reference for readers in that sector. Contains comprehensive discussions on state-of-the-art tools, techniques, and strategies from industry Connects the latest academic research to applications in industry including system reliability, safety assessment, and preventive maintenance Gives an in-depth analysis of the benefits and applications of modelling and simulation to reliability The book begins with an introduction to software reliability, models and techniques. The book is an informative book covering the strategies needed to assess software failure behaviour and its quality, as well as the application of optimization tools for major managerial decisions related to the software development process. It features a broad range of topics including

software reliability assessment and apportionment, optimal allocation and selection decisions and upgradations problems. It moves through a variety of problems related to the evolving field of optimization of software reliability engineering, including software release time, resource allocating, budget planning and warranty models, which are each explored in depth in dedicated chapters. This book provides a comprehensive insight into present-day practices in software reliability engineering, making it relevant to students, researchers, academics and practising consultants and engineers. Reliability theory is a major concern for engineers and managers engaged in making high quality products and designing highly reliable systems. "Advanced Reliability Models and Maintenance Policies" is a survey of new research topics in reliability theory and optimization techniques in reliability engineering. The book introduces partition and redundant problems within reliability models, and provides optimization techniques. The book also indicates how to perform maintenance in a finite time span and at failure detection, and to apply recovery techniques for computer systems. New themes such as reliability complexity and service reliability in reliability theory are theoretically proposed, and optimization problems in management science using reliability techniques are presented. The book is an essential guide for graduate students and researchers in reliability theory, and a valuable reference for reliability engineers engaged both in maintenance work and in management and computer systems. This textbook provides the tools for a modern post-graduate introductory course on system reliability theory. It focuses on probabilistic aspects of the theory, including recent results based on signatures, stochastic orders, aging classes, copulas and distortion (or aggregation) functions. The reader requires on an introductory knowledge on probability theory and mathematics. The book serves both for graduate students in mathematics and for engineering students in various disciplines as well as students learning survival analysis, network reliability or simple game theory. Included also are brief introductions to the basic aspects of lifetime modelling, stochastic comparisons, aging classes, mixtures and copula theory. The book develops this knowledge with worked examples and supplies code for the program R so that students can explore its lessons and techniques. As an overview of reliability performance and specification in new product development, Product Reliability is suitable for managers responsible for new product development. The methodology for making decisions relating to reliability performance and specification will be of use to engineers involved in product design and development. This book can be used as a text for graduate courses on design, manufacturing, new product development and operations management and in various engineering disciplines. This book is a collective work by many leading scientists, analysts, mathematicians, and engineers who have been working at the front end of reliability science and engineering. The book covers conventional and contemporary topics in reliability science, all of which have seen extended research activities in recent years. The methods presented in this book are real-world examples that demonstrate improvements in essential reliability and availability for industrial equipment such as medical magnetic resonance imaging, power systems, traction drives for a search and rescue helicopter, and air conditioning systems. The book presents real case studies of redundant multi-state air conditioning systems for chemical laboratories and covers assessments of reliability and fault tolerance and availability calculations. Conventional and contemporary topics in reliability engineering are discussed, including degradation, networks, and dynamic reliability, resilience, and multi-state systems, all of which are relatively new topics to the field. The book is aimed at engineers and scientists, as well as postgraduate students involved in reliability design, analysis, and experiments and applied probability and statistics. "Failure Rate Modeling for Reliability and Risk" focuses on reliability theory, and to the failure rate (hazard rate, force of mortality) modeling and its generalizations to systems operating in a random environment and to repairable systems. The failure rate is one of the crucial probabilistic characteristics for a number of disciplines; including reliability, survival analysis, risk analysis and demography. The book presents a systematic study of the failure rate and related indices, and covers a number of important applications where the failure rate plays the major role. Applications in engineering systems are studied, together with some actuarial, biological and demographic examples. The book provides a survey of this broad and interdisciplinary subject which will be invaluable to researchers and advanced students in reliability engineering and applied statistics, as well as to demographers, econometricians, actuaries and many other mathematically oriented researchers. A thoroughly updated and revised look at system reliability theory Since the first edition of this popular text was published nearly a decade ago, new standards have changed the focus of reliability engineering and introduced new concepts and terminology not previously addressed in the engineering literature. Consequently, the Second Edition of System Reliability Theory: Models, Statistical Methods, and Applications has been thoroughly rewritten and updated to meet current standards. To maximize its value as a pedagogical tool, the Second Edition features: Additional chapters on reliability of maintained systems and reliability assessment of safety-critical systems Discussion of basic assessment methods for operational availability and production regularity New concepts and terminology not covered in the first edition Revised sequencing of chapters for better pedagogical structure New problems, examples, and cases for a more applied focus An accompanying Web site with solutions, overheads, and supplementary information With its updated practical focus, incorporation of industry feedback, and many new examples based on real industry problems and data, the Second Edition of this important text should prove to be more useful than ever for students, instructors, and researchers alike. This monograph presents a survey of mathematical models useful in solving reliability problems. It includes a detailed discussion of life distributions corresponding to wearout and their use in determining maintenance policies, and covers important topics such as the theory of increasing (decreasing) failure rate distributions, optimum maintenance policies, and the theory of coherent systems. The emphasis throughout the book is on making minimal assumptions - and only those based on plausible physical considerations - so that the resulting mathematical deductions may be safely made about a large variety of commonly occurring reliability situations. The first part of the book is concerned with component reliability, while the second part covers system reliability, including problems that are as important today as they were in the 1960s. The enduring relevance of the subject of reliability and the continuing demand for a graduate-level book on this topic are the driving forces behind its re-publication. Evolved from the lectures of a recognized pioneer in developing the theory of reliability, Mathematical Models for Systems Reliability provides a rigorous treatment of the required probability background for understanding reliability theory. This classroom-tested text begins by discussing the Poisson process and its associated probability laws. It then uses a number of stochastic models to provide a framework for life length distributions and presents formal rules for computing the reliability of nonrepairable systems that possess commonly occurring structures. The next two chapters explore the stochastic behavior over time of one- and two-unit repairable systems. After covering general continuous-time Markov chains, pure birth and death processes, and transitions and rates diagrams, the authors consider first passage-time problems in the context of systems reliability. The final chapters show how certain techniques can be applied to a variety of reliability problems. Illustrating the models and methods with a host of examples, this book offers a sound introduction to mathematical probabilistic models and lucidly explores how they are used in systems reliability problems. Many serious accidents have happened in the world where systems have been large-scale and complex, and have caused heavy damage and a social sense of instability. Furthermore, advanced nations have almost finished public infrastructure and rushed into a maintenance period. Maintenance will be more important than production, manufacture, and construction, that is, more maintenance for environmental considerations and for the protection of natural resources. From now on, the importance of maintenance will increase more and more. In the past four decades, valuable contributions to maintenance policies in reliability theory have been made. This book is intended to summarize the research results studied mainly by the author in the past three decades. The book deals primarily with standard to advanced problems of maintenance policies for system reliability models. System reliability can be mainly improved by repair and preventive maintenance, and replacement, and reliability properties can be investigated by using stochastic process techniques. The optimum maintenance policies for systems that minimize or maximize appropriate objective functions under suitable conditions are discussed both analytically and practically. The book is composed of nine chapters. Chapter 1 is devoted to an introduction to reliability theory, and briefly reviews stochastic processes needed for reliability and maintenance theory. Chapter 2 summarizes the results of repair maintenance, which is the most basic maintenance in reliability. The repair maintenance of systems such as the one-unit system and multiple-unit redundant systems is treated. Chapters 3 through 5 summarize the results of three typical maintenance policies of age, periodic, and block replacements. This is the first monograph which presents shock and damage models in reliability from introduction to application. Stochastic processes are introduced before current developments are surveyed. The practical applications of shock and damage models are demonstrated using case studies. The author is a leading researcher in this field with more than thirty years of experience. Reliability engineers and managers of maintenance work will find this book a broad reference. This is the first monograph which presents

shock and damage models in reliability from introduction to application. Stochastic processes are introduced before current developments are surveyed. The practical applications of shock and damage models are demonstrated using case studies. The author is a leading researcher in this field with more than thirty years of experience. Reliability engineers and managers of maintenance work will find this book a broad reference. Our daily lives can be maintained by the high-technology systems. Computer systems are typical examples of such systems. We can enjoy our modern lives by using many computer systems. Much more importantly, we have to maintain such systems without failure, but cannot predict when such systems will fail and how to fix such systems without delay. A stochastic process is a set of outcomes of a random experiment indexed by time, and is one of the key tools needed to analyze the future behavior quantitatively. Reliability and maintainability technologies are of great interest and importance to the maintenance of such systems. Many mathematical models have been and will be proposed to describe reliability and maintainability systems by using the stochastic processes. The theme of this book is "Stochastic Models in Reliability and Maintainability." This book consists of 12 chapters on the theme above from the different viewpoints of stochastic modeling. Chapter 1 is devoted to "Renewal Processes," under which classical renewal theory is surveyed and computational methods are described. Chapter 2 discusses "Stochastic Orders," and in it some definitions and concepts on stochastic orders are described and aging properties can be characterized by stochastic orders. Chapter 3 is devoted to "Classical Maintenance Models," under which the so-called age, block and other replacement models are surveyed. Chapter 4 discusses "Modeling Plant Maintenance," describing how maintenance practice can be carried out for plant maintenance. Handbook and reference for industrial statisticians and system reliability engineers System Reliability Theory: Models, Statistical Methods, and Applications, Third Edition presents an updated and revised look at system reliability theory, modeling, and analytical methods. The new edition is based on feedback to the second edition from numerous students, professors, researchers, and industries around the world. New sections and chapters are added together with new real-world industry examples, and standards and problems are revised and updated. System Reliability Theory covers a broad and deep array of system reliability topics, including: · In depth discussion of failures and failure modes · The main system reliability assessment methods · Common-cause failure modeling · Deterioration modeling · Maintenance modeling and assessment using Python code · Bayesian probability and methods · Life data analysis using R Perfect for undergraduate and graduate students taking courses in reliability engineering, this book also serves as a reference and resource for practicing statisticians and engineers. Throughout, the book has a practical focus, incorporating industry feedback and real-world industry problems and examples. Over the last 50 years, the theory and the methods of reliability analysis have developed significantly. Therefore, it is very important to the reliability specialist to be informed of each reliability measure. This book will provide historical developments, current advancements, applications, numerous examples, and many case studies to bring the reader up-to-date with the advancements in this area. It covers reliability engineering in different branches, includes applications to reliability engineering practice, provides numerous examples to illustrate the theoretical results, and offers case studies along with real-world examples. This book is useful to engineering students, research scientist, and practitioners working in the field of reliability. Safety and Reliability - Theory and Applications contains the contributions presented at the 27th European Safety and Reliability Conference (ESREL 2017, Portorož, Slovenia, June 18-22, 2017). The book covers a wide range of topics, including: • Accident and Incident modelling • Economic Analysis in Risk Management • Foundational Issues in Risk Assessment and Management • Human Factors and Human Reliability • Maintenance Modeling and Applications • Mathematical Methods in Reliability and Safety • Prognostics and System Health Management • Resilience Engineering • Risk Assessment • Risk Management • Simulation for Safety and Reliability Analysis • Structural Reliability • System Reliability, and • Uncertainty Analysis. Selected special sessions include contributions on: the Marie Skłodowska-Curie innovative training network in structural safety; risk approaches in insurance and finance sectors; dynamic reliability and probabilistic safety assessment; Bayesian and statistical methods, reliability data and testing; organizational factors and safety culture; software reliability and safety; probabilistic methods applied to power systems; socio-technical-economic systems; advanced safety assessment methodologies: extended Probabilistic Safety Assessment; reliability; availability; maintainability and safety in railways: theory & practice; big data risk analysis and management, and model-based reliability and safety engineering. Safety and Reliability - Theory and Applications will be of interest to professionals and academics working in a wide range of industrial and governmental sectors including: Aeronautics and Aerospace, Automotive Engineering, Civil Engineering, Electrical and Electronic Engineering, Energy Production and Distribution, Environmental Engineering, Information Technology and Telecommunications, Critical Infrastructures, Insurance and Finance, Manufacturing, Marine Industry, Mechanical Engineering, Natural Hazards, Nuclear Engineering, Offshore Oil and Gas, Security and Protection, Transportation, and Policy Making. This volume contains extended versions of 28 carefully selected and reviewed papers presented at The Fourth International Conference on Mathematical Methods in Reliability in Santa Fe, New Mexico, June 21-25, 2004, the leading conference in reliability research. A broad overview of current research activities in reliability theory and its applications is provided with coverage on reliability modeling, network and system reliability, Bayesian methods, survival analysis, degradation and maintenance modeling, and software reliability. The contributors are all leading experts in the field and include the plenary session speakers, Tim Bedford, Thierry Duchesne, Henry Wynn, Vicki Bier, Edsel Pena, Michael Hamada, and Todd Graves. Reliability Modelling and Analysis in Discrete Time provides an overview of the probabilistic and statistical aspects connected with discrete reliability systems. This engaging book discusses their distributional properties and dependence structures before exploring various orderings associated between different reliability structures. Though clear explanations, multiple examples, and exhaustive coverage of the basic and advanced topics of research in this area, the work gives the reader a thorough understanding of the theory and concepts associated with discrete models and reliability structures. A comprehensive bibliography assists readers who are interested in further research and understanding. Requiring only an introductory understanding of statistics, this book offers valuable insight and coverage for students and researchers in Probability and Statistics, Electrical Engineering, and Reliability/Quality Engineering. The book also includes a comprehensive bibliography to assist readers seeking to delve deeper. Includes a valuable introduction to Reliability Theory before covering advanced topics of research and real world applications Features an emphasis on the mathematical theory of reliability modeling Provides many illustrative examples to foster reader understanding This book provides a comprehensive up-to-date presentation of some of the classical areas of reliability, based on a more advanced probabilistic framework using the modern theory of stochastic processes. This framework allows analysts to formulate general failure models, establish formulae for computing various performance measures, as well as determine how to identify optimal replacement policies in complex situations. In this second edition of the book, two major topics have been added to the original version: copula models which are used to study the effect of structural dependencies on the system reliability; and maintenance optimization which highlights delay time models under safety constraints. Terje Aven is Professor of Reliability and Risk Analysis at University of Stavanger, Norway. Uwe Jensen is working as a Professor at the Institute of Applied Mathematics and Statistics of the University of Hohenheim in Stuttgart, Germany. Review of first edition: "This is an excellent book on mathematical, statistical and stochastic models in reliability. The authors have done an excellent job of unifying some of the stochastic models in reliability. The book is a good reference book but may not be suitable as a textbook for students in professional fields such as engineering. This book may be used for graduate level seminar courses for students who have had at least the first course in stochastic processes and some knowledge of reliability mathematics. It should be a good reference book for researchers in reliability mathematics." -- Mathematical Reviews (2000) Textbook for a methods course or reference for an experimenter who is mainly interested in data analyses rather than in the mathematical development of the procedures. Provides the most useful statistical techniques, not only for the normal distribution, but for other important distributions, such as This book introduces a new notion of replacement in maintenance and reliability theory. Replacement Overtime, where replacement is done at the first completion of a working cycle over a planned time, is a new research topic in maintenance theory and also serves to provide a fresh optimization technique in reliability engineering. In comparing replacement overtime with standard and random replacement techniques theoretically and numerically, 'Maintenance Overtime Policies in Reliability Theory' highlights the key improvements to be gained by adopting this new approach and shows how they can be applied to inspection policies, parallel systems and cumulative damage models. Utilizing the latest research in replacement overtime by internationally recognized experts, the reader will be introduced to new topics and methods, and learn how to apply this knowledge practically to actual reliability models. This book will serve as an essential guide to a

new subject of study for graduate students and researchers and also provides a useful guide for reliability engineers and managers who have difficulties in maintenance of computer and production systems with random working cycles. Reliability is an essential concept in mathematics, computing, research, and all disciplines of engineering, and reliability as a characteristic is, in fact, a probability. Therefore, in this book, the author uses the statistical approach to reliability modelling along with the MINITAB software package to provide a comprehensive treatment of modelling, from the basics through advanced modelling techniques. The book begins by presenting a thorough grounding in the elements of modelling the lifetime of a single, non-repairable unit. Assuming no prior knowledge of the subject, the author includes a guide to all the fundamentals of probability theory, defines the various measures associated with reliability, then describes and discusses the more common lifetime models: the exponential, Weibull, normal, lognormal and gamma distributions. She concludes the groundwork by looking at ways of choosing and fitting the most appropriate model to a given data set, paying particular attention to two critical points: the effect of censored data and estimating lifetimes in the tail of the distribution. The focus then shifts to topics somewhat more difficult: the difference in the analysis of lifetimes for repairable versus non-repairable systems and whether repair truly "renews" the system; methods for dealing with system with reliability characteristic specified for more than one component or subsystem; the effect of different types of maintenance strategies; the analysis of life test data. The final chapter provides snapshot introductions to a range of advanced models and presents two case studies that illustrate various ideas from throughout the book. Updated and expanded and available for the first time in English, *System Reliability Theory* offers a balanced presentation of both theory and practice, making it an ideal introduction to reliability analysis for both industrial statisticians and engineers. *Risk, Reliability and Safety* contains papers describing innovations in theory and practice contributed to the scientific programme of the European Safety and Reliability conference (ESREL 2016), held at the University of Strathclyde in Glasgow, Scotland (25–29 September 2016). Authors include scientists, academics, practitioners, regulators and other key individuals with expertise and experience relevant to specific areas. Papers include domain specific applications as well as general modelling methods. Papers cover evaluation of contemporary solutions, exploration of future challenges, and exposition of concepts, methods and processes. Topics include human factors, occupational health and safety, dynamic and systems reliability modelling, maintenance optimisation, uncertainty analysis, resilience assessment, risk and crisis management. Using clear language, this book shows you how to build in, evaluate, and demonstrate reliability and availability of components, equipment, and systems. It presents the state of the art in theory and practice, and is based on the author's 30 years' experience, half in industry and half as professor of reliability engineering at the ETH, Zurich. In this extended edition, new models and considerations have been added for reliability data analysis and fault tolerant reconfigurable repairable systems including reward and frequency / duration aspects. New design rules for imperfect switching, incomplete coverage, items with more than 2 states, and phased-mission systems, as well as a Monte Carlo approach useful for rare events are given. Trends in quality management are outlined. Methods and tools are given in such a way that they can be tailored to cover different reliability requirement levels and be used to investigate safety as well. The book contains a large number of tables, figures, and examples to support the practical aspects.

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