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this book covers using r for doing optimization a key area of operations research which has been applied to virtually every industry the focus is on linear and mixed integer optimization it uses an algebraic modeling approach for creating formulations that pairs naturally with an algebraic implementation in r with the rapid rise of interest in data analytics a data analytics platform is key working technology and business professionals need an awareness of the tools and language of data analysis r reduces the barrier to entry for people to start using data analytics tools philosophically the book emphasizes creating formulations before going into implementation algebraic representation allows for clear understanding and generalization of large applications and writing formulations is necessary to explain and convey the modeling decisions made appendix a introduces r mathematics is used at the level of subscripts and summations refreshers are provided in appendix b this book provides and explains code so examples are relatively clear and self contained emphasizes creating algebraic formulations before implementing focuses on application rather than algorithmic details embodies the philosophy of reproducible research uses open source tools to ensure access to powerful optimization tools promotes open source all materials are available on the author s github repository demonstrates common debugging

practices with a troubleshooting emphasis specific to optimization modeling using r provides code readers can adapt to their own applications this book can be used for graduate and undergraduate courses for students without a background in optimization and with varying mathematical backgrounds

in an era of intense competition where plant operating efficiencies must be maximized downtime due to machinery failure has become more costly to cut operating costs and increase revenues industries have an urgent need to predict fault progression and remaining lifespan of industrial machines processes and systems an engineer who mounts an acoustic sensor onto a spindle motor wants to know when the ball bearings will wear out without having to halt the ongoing milling processes a scientist working on sensor networks wants to know which sensors are redundant and can be pruned off to save operational and computational overheads these scenarios illustrate a need for new and unified perspectives in system analysis and design for engineering applications intelligent diagnosis and prognosis of industrial networked systems proposes linear mathematical tool sets that can be applied to realistic engineering systems the book offers an overview of the fundamentals of vectors matrices and linear systems theory required for intelligent diagnosis and prognosis of industrial networked systems building on this theory it then develops automated mathematical machineries and formal decision software tools for real world applications the book includes portable tool sets for many industrial applications including forecasting machine tool wear in industrial cutting machines reduction of sensors and features for industrial fault detection and isolation fdi identification of critical resonant modes in mechatronic systems for system design of r d probabilistic small signal stability in large scale interconnected power systems discrete event command and control for military applications the book also proposes future directions for intelligent diagnosis and prognosis in energy efficient manufacturing life cycle assessment and systems of systems architecture written in a concise and accessible style it presents tools that are mathematically rigorous but not involved bridging academia research and industry this reference supplies the know how for engineers and managers making decisions about equipment maintenance as well as researchers and students in the field

nonlinear parameter optimization using r john c nash telfer school of management university of ottawa canada a systematic and comprehensive treatment of optimization software using r in recent decades optimization techniques have been streamlined by computational and artificial intelligence methods to analyze more variables especially under non linear multivariable conditions more quickly than ever before optimization is an important tool for decision science and for the analysis of physical systems used in engineering nonlinear parameter optimization with r

explores the principal tools available in r for function minimization optimization and nonlinear parameter determination and features numerous examples throughout nonlinear parameter optimization with r provides a comprehensive treatment of optimization techniques examines optimization problems that arise in statistics and how to solve them using r enables researchers and practitioners to solve parameter determination problems presents traditional methods as well as recent developments in r is supported by an accompanying website featuring r code examples and datasets researchers and practitioners who have to solve parameter determination problems who are users of r but are novices in the field optimization or function minimization will benefit from this book it will also be useful for scientists building and estimating nonlinear models in various fields such as hydrology sports forecasting ecology chemical engineering pharmaco kinetics agriculture economics and statistics

this proceedings volume consists of refereed papers presented at the second international conference on computing mathematics and statistics icms 2015 held in langkawi malaysia in november 2015 divided into three sections computer science mathematics and statistics the book includes both quantitative and qualitative research that confronts current societal issues within the main sections the book also covers education based research works and the applications of computer and mathematical sciences in social science business industries and the life and hard sciences drawing on the theme bridging research endeavor on computing mathematics and statistics each of the conference papers are carefully selected and edited to cater to readers from diverse applied and social sciences backgrounds the book allows for the contemplation and reflection on the possibility of the knowledge growth and knowledge sharing in building a better world for future generations

this book gathers the main recent results on positive trigonometric polynomials within a unitary framework the book has two parts theory and applications the theory of sum of squares trigonometric polynomials is presented unitarily based on the concept of gram matrix extended to gram pair or gram set the applications part is organized as a collection of related problems that use systematically the theoretical results

this new edition to the classic book by ggplot2 creator hadley wickham highlights compatibility with knitr and rstudio ggplot2 is a data visualization package for r that helps users create data graphics including those that are multi layered with ease with ggplot2 it s easy to produce handsome publication quality plots with automatic legends created from the plot specification superimpose multiple layers points lines maps tiles box plots from different data sources with automatically

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constituting the refereed proceedings of the 10th international conference on relational methods in computer science relmics 2008 and the 5th international conference on applications of kleene algebras these papers were selected from numerous submissions

this book provides a cutting edge research overview on the latest developments in the field of optics and photonics all chapters are authored by the pioneers in their field and will cover the developments in quantum photonics optical properties of 2d materials optical sensors organic opto electronics nanophotonics metamaterials plasmonics quantum cascade lasers leds biophotonics and biomedical photonics and spectroscopy

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