Numerical Simulation Of Optical Wave Propagation With Examples In Matlab

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this book is for students following an introductory course in numerical methods numerical techniques or numerical analysis it introduces matlab as a computing environment for experimenting with numerical methods it approaches the subject from a pragmatic viewpoint theory is kept at a minimum commensurate with comprehensive coverage of the subject and it contains abundant worked examples which provide easy understanding through a clear and concise theoretical treatment this edition places even greater emphasis on learning by doing than the previous edition fully documented matlab code for the numerical methods described in the book will be available as supplementary material to the book on extras springer com

matlab by example guides the reader through each step of writing matlab programs the book assumes no previous programming experience on the part of the reader and uses multiple examples in clear language to introduce concepts and practical tools straightforward and detailed instructions allow beginners to learn and develop their matlab skills quickly the book consists of ten chapters discussing in detail the integrated development environment ide scalars vectors arrays adopting structured programming style using functions and recursive functions control flow debugging profiling and structures a chapter also describes symbolic math toolbox teaching readers how to solve algebraic equations differentiation integration differential equations and laplace and fourier transforms containing hundreds of examples illustrated using screen shots hundreds of exercises and three projects this book can be used to complement coursework or as a self study book and can be used as a textbook in universities colleges and high schools no programming experience necessary to learn matlab examples with screenshots and plentiful exercises throughout help make matlab easy to understand projects enable readers to write long matlab programs and take the first step toward being a professional matlab programmer

imaging modalities in radiology produce ever increasing amounts of data which need to be displayed optimized analyzed and archived a big data as well as an image processing problem computer programming skills are rarely emphasized during the education and training of medical physicists meaning that many individuals enter the workplace without the ability to efficiently solve many real world clinical problems this book provides a foundation for the teaching and learning of programming for medical physicists and other professions in the field of radiology and offers valuable content for novices and more experienced readers alike it focuses on providing readers with practical skills on how to implement matlab as an everyday tool rather than on solving academic and abstract physics problems further it recognizes that matlab is only one tool in a medical physicist s toolkit and shows how it can be used as the glue to integrate other software and processes together yet with great power comes great responsibility the pitfalls to deploying your own software in a clinical environment are also clearly explained this book is an ideal companion for all medical

physicists and medical professionals looking to learn how to utilize matlab in their work features encompasses a wide range of medical physics applications in diagnostic and interventional radiology advances the skill of the reader by taking them through real world practical examples and solutions with access to an online resource of example code the diverse examples of varying difficulty make the book suitable for readers from a variety of backgrounds and with different levels of programming experience

this second edition focuses on the application of statistical methods in the field of hydrology and hydroclimatology among the latest theories being used in these fields the book introduces the theory of copulas and its applications in this context the purpose is to develop an understanding and illustrate the usefulness of the statistical techniques with detailed theory and numerous worked out examples apart from this sample scripts based on matlab python and r for some examples are also provided to assist the readers to handle real life data besides serving as a textbook for graduate courses on stochastic modeling in hydrology and related disciplines the book offers a valuable resource for researchers and professionals involved in the field of hydrology and climatology

symbolic dynamics is a rapidly growing area of dynamical systems although it originated as a method to study general dynamical systems it has found significant uses in coding for data storage and transmission as well as in linear algebra this book is the first general textbook on symbolic dynamics and its applications to coding mathematical prerequisites are relatively modest mainly linear algebra at the undergraduate level especially for the first half of the book topics are carefully developed and motivated with many examples and there are over 500 exercises to test the reader s understanding the last chapter contains a survey of more advanced topics and a comprehensive bibliography is included this book will serve as an introduction to symbolic dynamics for advanced undergraduate students in mathematics engineering and computer science

content based image classification efficient machine learning using robust feature extraction techniques is a comprehensive guide to research with invaluable image data social science research network has revealed that 65 of people are visual learners research data provided by hyerle 2000 has clearly shown 90 of information in the human brain is visual thus it is no wonder that visual information processing in the brain is 60 000 times faster than text based information 3m corporation 2001 recently we have witnessed a significant surge in conversing with images due to the popularity of social networking platforms the other reason for embracing usage of image data is the mass availability of high resolution cellphone cameras wide usage of image data in diversified application areas including medical science media sports remote sensing and so on has spurred the need for further research in optimizing archival maintenance

and retrieval of appropriate image content to leverage data driven decision making this book demonstrates several techniques of image processing to represent image data in a desired format for information identification it discusses the application of machine learning and deep learning for identifying and categorizing appropriate image data helpful in designing automated decision support systems the book offers comprehensive coverage of the most essential topics including image feature extraction with novel handcrafted techniques traditional feature extraction image feature extraction with automated techniques representation learning with cnns significance of fusion based approaches in enhancing classification accuracy matlab codes for implementing the techniques use of the open access data mining tool weka for multiple tasks the book is intended for budding researchers technocrats engineering students and machine learning deep learning enthusiasts who are willing to start their computer vision journey with content based image recognition the readers will get a clear picture of the essentials for transforming the image data into valuable means for insight generation readers will learn coding techniques necessary to propose novel mechanisms and disruptive approaches the weka guide provided is beneficial for those uncomfortable coding for machine learning algorithms the weka tool assists the learner in implementing machine learning algorithms with the click of a button thus this book will be a stepping stone for your machine learning journey please visit the author's website for any further guidance at rikdas com

mounting evidence in the last years has demonstrated that self regulation of brain activity can successfully be achieved by neurofeedback of these methodologies have constituted themselves as new tools for cognitive neuroscience establishing causal links between voluntary brain activations and cognition and behavior and as potential novel approaches for clinical applications in severe neuropsychiatric disorders e.g. schizophrenia depression parkinson s disease etc current developments of brain imaging based neurofeedback include the study of the behavioral modifications and neural reorganization produced by learned regulation of the activity of circumscribed brain regions and neuronal network activations in a rapidly developing field many open questions and controversies have arisen i e choosing the proper experimental design the adequate use of control conditions and subjects the mechanism of learning involved in brain self regulation and the still unexplored potential long lasting effect on brain reorganization and clinical alleviation among others this special issue on self regulation of the brain of emotion and attention using of approaches interested authors to report technical and methodological advances scientific investigations in understanding the relation between brain activity and behaviour using of and finally studies developing clinical treatment of emotional and attentional disorders the editors of this special issue anticipate rapid developments in this emerging field

aimed at those studying electrical and computer engineering this text encourages students to learn the fundamentals of circuit theory which is necessary for the complete study of electrical engineering

this text presents a comprehensive treatment of signal processing and linear systems suitable for juniors and seniors in electrical engineering it is based on lathi s widely used book linear systems and signals with additional applications to communications controls and filtering as well as new chapters on analog and digital filters and digital signal processing this volume s organization is different from the earlier book here the laplace transform follows fourier rather than the reverse continuous time and discrete time systems are treated sequentially rather than interwoven additionally the text contains enough material in discrete time systems to be used not only for a traditional course in signals and systems but also for an introductory course in digital signal processing in signal processing and linear systems as in all his books lathi emphasizes the physical appreciation of concepts rather than the mere mathematical manipulation of symbols avoiding the tendency to treat engineering as a branch of applied mathematics he uses mathematics not so much to prove an axiomatic theory as to enhance physical and intuitive understanding of concepts wherever possible theoretical results are supported by carefully chosen examples and analogies allowing students to intuitively discover meaning for themselves an accompanying solutions manual is available on cd rom

sections on important areas such as spread spectrum cellular communications and orthogonal frequency division multiplexing are provided computational examples are included illustrating how to use the computer as a simulation tool thereby allowing waveforms spectra and performance curves to be generated overviews of the necessary background in signal system probability and random process theory required for the analog and digital communications topics covered in the book

the text provides motivation for students to learn because they Il discover how various concepts relate to the engineering profession through these real world examples of signals and systems an abundant use of examples and drill problems are integrated throughout so they Il be able to master the material and a large number of end of chapter problems are provided to help solidify the concepts

offering an up to date practical approach to learning and implementing lab skills technical reporting and data analysis this text also comes with a supporting website providing problem solutions and lab discussions for instructors powerpoint slides internet links and other resources

provides a truly accessible introduction and a fully integrated approach to fuzzy systems and neural networks the definitive text for students and practicing engineers researchers are already applying neural networks and fuzzy systems in series from the use of fuzzy inputs and outputs for neural networks to the employment of individual neural networks to quantify the shape of a fuzzy membership function but the integration of these two fields into a neurofuzzy technology holds even greater potential benefits in reducing computing time and optimizing results fuzzy and neural approaches in engineering presents a detailed examination of the fundamentals of fuzzy systems and neural networks and then joins them synergistically combining the feature extraction and modeling capabilities of the neural network with the representation capabilities of fuzzy systems exploring the value of relating genetic algorithms and expert systems to fuzzy and neural technologies this forward thinking text highlights an entire range of dynamic possibilities within soft computing with examples specifically designed to illuminate key concepts and overcome the obstacles of notation and overly mathematical presentations often encountered in other sources plus tables figures and an up to date bibliography this unique work is both an important reference and a practical guide to neural networks and fuzzy systems

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