An Open Source Inversion Algorithm For The Munsell Renotation

This volume describes how controlled-source electromagnetic (CSEM) methods are used to determine the electrical conductivity and hydrocarbon content of the upper few kilometres of the Earth, on land and at sea. The authors show how the signal-to-noise ratio of the measured data may be maximised via suitable choice of acquisition and processing parameters and selection of subsequent data analysis procedures. Complete impulse responses for every electric and magnetic source and receiver configuration are derived, providing a guide to the expected response for real data. 1-D, 2-D and 3-D modelling and inversion procedures for recovery of Earth conductivity are presented, emphasising the importance of updating model parameters using complementary geophysical data and rock physics relations. Requiring no specialist prior knowledge of electromagnetic theory, and providing a step-by-step guide through the necessary mathematics, this book provides an accessible introduction for advanced students, researchers and industry practitioners in exploration geoscience and petroleum engineering.

Contains papers and posters presented at Hazards XVII.

This practical technical guide to embedded middleware implementation offers a coherent framework that guides readers through all the key concepts necessary to gain an understanding of this broad topic. It integrates big picture theoretical discussion with down-to-earth advice on successful real-world use via step-by-step examples of each type of middleware implementation. It demystifies core middleware, such as networking protocols, file systems, virtual machines, and databases; more complex middleware that builds upon generic pieces, such as MOM, ORB, and RPC; and integrated middleware software packages, such as embedded JVMs, .NET, and CORBA packages. Technically detailed case studies bring it all together, by providing insight into typical engineering situations readers are likely to encounter. * The only complete guide to middleware, one of the most important AND most widely misunderstood aspects of embedded systems - hundreds of devices, from digital TVs to smart phones, can't function without it! * Offers thorough middleware coverage, including basic theory and core middleware, as well as complex implementations and integrated packages * Detailed case studies, real-world examples, hundreds of diagrams, and a free CD-ROM provide context and aid understanding of embedded middleware

This book constitutes the proceedings of the Third International Workshop on Foundational and Practical Aspects of Resource Analysis, FOPARA 2013, held in Bertinoro, Italy, in August 2013. The 9 papers presented in this volume were carefully reviewed and selected from 12 submissions. They deal with traditional approaches to complexity analysis, differential privacy, and probabilistic analysis of programs.

Increasing evidence supports the claim that stress changes play a fundamental role in triggering volcanic eruptions. Stress changes may vary in origin to include earthquakes, erosion and landslide processes, deglaciation, or tidal effects. The local stress can also change as response of magma influx from deeper reservoirs and an increase of the magma/gas pressure. The stress transfer may be of great importance in reawakening a dormant system. As an example, significant statistical correlation of large earthquakes and eruptions in time and space was suggested in many works. The interaction may be two-fold; where magma intrusions may change the stress at active faults and trigger earthquakes, while tectonic earthquakes may affect the magmatic system and change the eruption activity. The change in local tectonic stress has been claimed as trigger of large ignimbrite eruptions or for controlling the eruptive style of explosive eruptions. Sometimes volcano systems that are nested or closely located may become active in chorus; neighbouring volcanoes may interact in the sense that one volcano triggers its neighbouring volcano. However, although there is ample evidence of concurrence, the processes of interacting volcanoes and near- to far-field tectonic stress are not well understood. Some studies suggest that volcanic eruptions are triggered if compressive stress acts at the magma system and “squeezes” out magma. Other studies suggest that extensional stress fields facilitate magma rise and thus encourage eruptions, or that fluctuating compression and extension during the passing of seismic waves trigger eruptions. This research topic tries to address some of the important open questions in interaction between stress field and volcanic eruption, though both review papers and new contributions.

Advances in Geophysics, Volume 58, the latest in this critically acclaimed serialized review journal that has published for over 50 years, contains the latest information available in the field. Users will find valuable chapters highlighting the Novel use of geodynamics in plate tectonic reconstruction, and on Optimized experimental design in the context of seismic full waveform inversion and seismic imaging. Since 1952, each volume in this series has been eagerly awaited, frequently consulted, and praised by researchers and reviewers alike. Now in its 58th volume, it is truly an essential publication for researchers in all fields of geophysics. Provides high-level reviews of the latest innovations in geophysics Written by recognized experts in the field Essential publication for researchers in all fields of geophysics

Once the privilege of a secret few, cryptography is now taught at universities around the world. Introduction to Cryptography with Open-Source Software illustrates algorithms and cryptosystems using examples and the open-source computer algebra system of Sage. The author, a noted educator in the field, provides a highly practical learning experience by progressing at a gentle pace, keeping mathematics at a manageable level, and including numerous end-of-chapter exercises. Focusing on the cryptosystems themselves rather than the means of breaking them, the book first explores when and how the methods of modern cryptography can be used and misused. It then presents number theory and the algorithms and methods that make up the basis of cryptography today. After a brief review of "classical" cryptography, the book introduces information theory and examines the public-key cryptosystems of RSA and Rabin’s cryptosystem. Other public-key systems studied include the El Gamal cryptosystem, systems based on knapsack problems, and algorithms for creating digital signature schemes. The second half of the text moves on to consider bit-oriented secret-key, or symmetric, systems suitable for encrypting large amounts of data. The author describes block ciphers (including the Data Encryption Standard), cryptographic hash functions, finite fields, the Advanced Encryption Standard, cryptosystems based on elliptical curves, random number generation, and stream ciphers. The book concludes with a look at examples and applications of modern cryptographic systems, such as multi-party computation, zero-knowledge proofs, oblivious transfer, and voting protocols.

Multifrequency Electromagnetic Data Interpretation for Subsurface Characterization focuses on the development and application of electromagnetic measurement methodologies and their interpretation techniques for subsurface characterization. The book guides readers on how to characterize and understand materials using electromagnetic measurements, including dielectric permittivity, resistivity and conductivity measurements. This reference will be useful for subsurface engineers, petrophysicists, subsurface data analysts, geophysicists, hydrogeologists, and geoscientists who want to know how to develop tools and techniques of electromagnetic measurements and interpretation for subsurface characterization. Includes case studies to add additional color to the presented content Provides codes for the mechanistic modeling of multi-frequency conductivity and relative permittivity of porous geomaterials Presents detailed descriptions of multifrequency electromagnetic data interpretation models and inversion algorithm

Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations. Readers will learn how to structure Big data in a way that is amenable to ML algorithms; how to conduct research with ML algorithms on that data; how to use supercomputing methods; how to backtest your discoveries while avoiding false positives. The book addresses real-life problems faced by practitioners on a daily basis, and explains scientifically sound solutions using math, supported by code and examples.

Readers become active users who can test the proposed solutions in their particular setting. Written by a recognized expert and portfolio manager, this book will equip investment professionals with the groundbreaking tools needed to succeed in modern finance.

This volume provides a broad and uniform introduction of PDE-constrained optimization as well as to document a number of interesting and challenging applications. Many science and engineering applications necessitate the solution of optimization problems constrained by physical laws that are described by systems of partial differential equations (PDEs)?. As a result, PDE-constrained optimization problems arise in a variety of disciplines including geophysics, earth and climate science, material science, chemical and mechanical engineering, medical imaging and physics. This volume is divided into two parts. The first part provides a comprehensive treatment of PDE-constrained optimization including discussions of problems constrained by PDEs with uncertain inputs and problems constrained by variational inequalities. Special emphasis is placed on algorithm development and numerical computation. In addition, a comprehensive treatment of inverse problems arising in the oil and gas industry is provided. The second part of this volume focuses on the application of PDE-constrained optimization, including problems in optimal control, optimal design, and inverse problems, among other topics.

Innovation in Near-Surface Geophysics: Instrumentation, Application, and Data Processing Methods offers an advanced look at state-of-the-art and innovative technologies for near surface geophysics, exposing the latest, most effective techniques in an accessible way. By addressing a variety of geophysical applications, including cultural heritage, civil engineering, characteristics of soil, and others, the book provides an understanding of the best products and methodologies modern near surface geophysics has to offer. It proposes tips for new ideas and projects, and encourages collaboration across disciplines and techniques for the best implementation and results. Clearly organized, with contributions from leaders from throughout geophysics, Innovation in Near-Surface Geophysics is an important guide for geophysicists who hope to gain a better understanding of the tools and techniques available. Addresses a variety of applications in near-surface geophysics, including cultural heritage, civil engineering, soil analysis, etc. Provides insight to available products and techniques and offers suggestions for future developments Clearly organized by techniques and their applications

Numerical models of flow and transport processes are heavily employed in the fields of surface, soil, and groundwater hydrology. They are used to interpret field observations, analyze complex and coupled processes, or to support decision making related to large societal issues such as the water-energy nexus or sustainable water management and food production. Parameter estimation and uncertainty quantification are two key features of modern science-based predictions. When applied to water resources, these tasks must cope with many degrees of freedom and large datasets. Both are challenging and require novel theoretical and computational approaches to handle complex models with large number of unknown parameters.

This collection of papers on geophysical inversion contains research and survey articles on where the field has been and where it's going, and what is practical and what is not. Topics covered include seismic tomography, migration and inverse scattering.

Optimization methodologies are fundamental instruments to tackle the complexity of today's engineering processes. Engineering Optimization 2014 is dedicated to optimization methods in engineering, and contains the papers presented at the 4th International Conference on Engineering Optimization (ENGOPT2014, Lisbon, Portugal, 8-11 September 2014). The book will be of interest to engineers, applied mathematicians, and computer scientists working on research, development and practical applications of optimization methods in engineering.

Microwave imaging techniques allow for the development of systems that are able to inspect, identify, and characterize in a noninvasive fashion under different scenarios, ranging from biomedical to subsurface diagnostics as well as from surveillance and security applications to nondestructive evaluation. Such great opportunities, though, are actually severely limited by difficulties arising from the solution of the underlying inverse scattering problem. As a result, ongoing research efforts in this area are devoted to developing inversion strategies and experimental apparatus so that they are as reliable and accurate as possible with respect to reconstruction capabilities and resolution performance, respectively. The intent of this Special Issue is to present the experiences of leading scientists in the electromagnetic inverse scattering community, as well as to serve as an assessment tool for people who are new to the area of microwave imaging and electromagnetic inverse scattering problems.

Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions contains invited, keynote and theme lectures and regular papers presented at the 7th International Conference on Earthquake Geotechnical Engineering (Rome, Italy, 17-20 June 2019. The contributions deal with recent developments and advancements as well as case histories, field monitoring, experimental characterization, physical and analytical modelling, and applications related to the variety of environmental phenomena induced by earthquakes in soils and their effects on engineered systems interacting with them. The book is divided in the sections below: Invited papers Keynote papers Theme lectures Special Session on Large Scale Testing Special Session on Liquefact Projects Special Session on Lessons learned from recent earthquakes Special Session on the Central Italy earthquake Regular papers Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions provides a significant up-to-date collection of recent experiences and developments, and aims at engineers, geologists and seismologists, consultants, public and private contractors, local national and international authorities, and to all those involved in research and practice related to Earthquake Geotechnical Engineering.

This comprehensive collection of lectures by leading experts in the field introduces and reviews all relevant computer simulation methods and their applications in condensed matter systems. Volume 1 is an in-depth introduction to a vast spectrum of computational techniques for

statistical mechanical systems of condensed matter. Volume 2 is a collection of state-of-the-art surveys on numerical experiments carried out for a great number of systems.

This book provides a large extension of the general theory of reproducing kernels published by N. Aronszajn in 1950, with many concrete applications.In Chapter 1, many concrete reproducing kernels are first introduced with detailed information. Chapter 2 presents a general and global theory of reproducing kernels with basic applications in a self-contained way. Many fundamental operations among reproducing kernel Hilbert spaces are dealt with. Chapter 2 is the heart of this book.Chapter 3 is devoted to the Tikhonov regularization using the theory of reproducing kernels with applications to numerical and practical solutions of bounded linear operator equations.In Chapter 4, the numerical real inversion formulas of the Laplace transform are presented by applying the Tikhonov regularization, where the reproducing kernels play a key role in the results.Chapter 5 deals with ordinary differential equations; Chapter 6 includes many concrete results for various fundamental partial differential equations. In Chapter 7, typical integral equations are presented with discretization methods. These chapters are applications of the general theories of Chapter 3 with the purpose of practical and numerical constructions of the solutions.In Chapter 8, hot topics on reproducing kernels are presented; namely, norm inequalities, convolution inequalities, inversion of an arbitrary matrix, representations of inverse mappings, identifications of nonlinear systems, sampling theory, statistical learning theory and membership problems. Relationships among eigen-functions, initial value problems for linear partial differential equations, and reproducing kernels are also presented. Further, new fundamental results on generalized reproducing kernels, generalized delta functions, generalized reproducing kernel Hilbert spaces, andas well, a general integral transform theory are introduced.In three Appendices, the deep theory of Akira Yamada discussing the equality problems in nonlinear norm inequalities, Yamada's unified and generalized inequalities for Opial's inequalities and the concrete and explicit integral representation of the implicit functions are presented.

This well-respected text introduces the theory and application of modern numerical approximation techniques to students taking a one- or two-semester course in numerical analysis. Providing an accessible treatment that only requires a calculus prerequisite, the authors explain how, why, and when approximation techniques can be expected to work-and why, in some situations, they fail. A wealth of examples and exercises develop students' intuition, and demonstrate the subject's practical applications to important everyday problems in math, computing, engineering, and physical science disciplines. The first book of its kind when crafted more than 30 years ago to serve a diverse undergraduate audience, Burden, Faires, and Burden's NUMERICAL ANALYSIS remains the definitive introduction to a vital and practical subject. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

which successfully passed the QA-process (i.e., met the Data Quality Objectices) were included into the TFS-central data bank. The following summary of major results obtained in TFS would not have been possible without the contribution of many experimentalists and modellers participating in this project. I would like to thank these colleagues for their support. All participants are grateful for the financial support by the BMBF and for the assistance by the Projekttragerschaft (UKF-GSF-Miinchen). Garmisch-Partenkirchen, WOLFGANG SEILER February 2002 DEVELOPMENT AND APPLICATION OF A MESOSCALE MODEL HIERARCHY FOR THE DIAGNOSIS AND FORECAST OF THE DISTRIBUTION OF POLLUTANTS OVER GERMANY AND EUROPE Journal of Atmospheric Chemistry 42: 5-22, 2002. 5 (c) 2002 Kluwer Academic Publishers. An Empirical, Receptor-Based Procedure for Assessing the Effect of Different Ozone Mitigation Strategies WOLFGANG FRICKE, WINFRIED VANDERSEE and STEFAN GILGE Deutscher Wetterdienst, Meteorologisches Observatorium, Albin-Schwaiger-Weg 10, D-82383 Hohenpeissenberg, Germany, e-mail: wolfgang.fricke@dwd.de (Received: 6 November 2000; in final form: 29 May 2(01) Abstract. The paper presents a new receptor-based approach for investigating the effect of differ- ent mitigation strategies on surface ozone concentrations. The empirical approach relates measured ozone concentrations to 3-D back trajectories and European precursor emission data (NOx, VOC, isoprene). These are the only parameters used as input. Following a description of the method, results for two German stations, an urban and a rural mountain site, are described, and discussed in detail.

Embedded Software Development: The Open-Source Approach delivers a practical introduction to embedded software development, with a focus on open-source components. This programmer-centric book is written in a way that enables even novice practitioners to grasp the development process as a whole. Incorporating real code fragments and explicit, real-world open-source operating system references (in particular, FreeRTOS) throughout, the text: Defines the role and purpose of embedded systems, describing their internal structure and interfacing with software development tools Examines the inner workings of the GNU compiler collection (GCC)-based software development system or, in other words, toolchain Presents software execution models that can be adopted profitably to model and express concurrency Addresses the basic nomenclature, models, and concepts related to task-based scheduling algorithms Shows how an open-source protocol stack can be integrated in an embedded system and interfaced with other software components Analyzes the main components of the FreeRTOS Application Programming Interface (API), detailing the implementation of key operating system concepts Discusses advanced topics such as formal verification, model checking, runtime checks, memory corruption, security, and dependability Embedded Software Development: The Open-Source Approach capitalizes on the authors’ extensive research on real-time operating systems and communications used in embedded applications, often carried out in strict cooperation with industry. Thus, the book serves as a springboard for further research.

The intention of this collection agrees with the purposes of the homonymous mini-symposium (MS) at ICIAM-2019, which were to overview the essentials of geometric calculus (GC) formalism, to report on state-of-the-art applications showcasing its advantages and to explore the bearing of GC in novel approaches to deep learning. The first three contributions, which correspond to lectures at the MS, offer perspectives on recent advances in the application GC in the areas of robotics, molecular geometry, and medical imaging. The next three, especially invited, hone the expressiveness of GC in orientation measurements under different metrics, the treatment of contact elements, and the investigation of efficient computational methodologies. The last two, which also correspond to lectures at the MS, deal with two aspects of deep learning: a presentation of a concrete quaternionic convolutional neural network layer for image classification that features contrast invariance and a general overview of automatic learning aimed at steering the development of neural networks whose units process elements of a suitable algebra, such as a geometric algebra. The book fits, broadly speaking, within the realm of mathematical engineering, and consequently, it is intended for a wide spectrum of research profiles. In particular, it should bring inspiration and guidance to those looking for materials and problems that bridge GC with applications of great current interest, including the auspicious field of GC-based deep neural networks.

This book constitutes the refereed proceedings of the Fourth International Symposium on Cyber Security Cryptography and Machine Learning, CSCML 2020, held in Be'er Sheva, Israel, in July 2020. The 12 full and 4 short papers presented in this volume were carefully reviewed and selected from 38 submissions. They deal with the theory, design, analysis, implementation, or application of cyber security, cryptography and machine learning systems and networks, and conceptually innovative topics in these research areas.

This book addresses issues of scattering theory and biomedical engineering, as well as methodological approaches and tools from related scientific areas such as applied mathematics, mechanics, numerical analysis, and signal and image processing. Contents:Scattering Theory:Atkinson–Wilcox Theorem for Convex Obstacles (V Georgiev et al.)Inverse Obstacle Scattering with Modified or Reduced Data (R Kress)On Constructive Methods for Wave Scattering by Time Dependent Potentials (G F Roach)Applied Mathematics Methods:An Introduction to Parallel Coordinates and Their Applications (A Inselberg)Travelling Waves for Gas-Solid Reactions with Porosity Change (I

Stakgold & A Di Liddo)Wave Propagation in Photonic Crystal Models (S Venakides et al.)Biomedical Engineering:Applications of Shape Memory Alloys to Bioengineering and Biomedical Technology (D C Lagoudas et al.)Classification of Ultrasonic Liver Images Using a New Estimator of Fractal Dimension (P Asvestas et al.)The Human Head Neck System: A Review of Modelling Approaches (A Charalambopoulos et al.) Readership: Researchers and graduate students in scattering theory, biomedical engineering, applied mathematics and mechanics. Keywords:Scattering Theory;Biomedical Engineering;Methodological Approaches;Atkinson-Wilcox Theorem;Convex Obstacles;Inverse Obstacle Scattering;Wave Scattering;Parallel Coordinates;Porosity Change;Propagation;Photonic Crystal Models;Shape Memory Alloys;Ultrasonic Liver Images

This book constitutes revised and selected papers of the 9th European Workshop on Reinforcement Learning, EWRL 2011, which took place in Athens, Greece in September 2011. The papers presented were carefully reviewed and selected from 40 submissions. The papers are organized in topical sections online reinforcement learning, learning and exploring MDPs, function approximation methods for reinforcement learning, macro-actions in reinforcement learning, policy search and bounds, multi-task and transfer reinforcement learning, multi-agent reinforcement learning, apprenticeship and inverse reinforcement learning and real-world reinforcement learning.

This book combines essential finite element (FE) theory with a set of fourteen tutorials using relatively easy-to-use open source CAD, FE and other numerical analysis codes so a student can undertake practical analysis and self-study. The theory covers fundamentals of the finite element method. Formulation of element stiffness for one dimensional bar and beam, two dimensional and three dimensional continuum elements, plate and shell elements are derived based on energy and variational methods. Linear, nonlinear and transient dynamic solution methods are covered for both mechanical and field analysis problems with a focus on heat transfer. Other important theoretical topics covered include element integration, element assembly, loads, boundary conditions, contact and a chapter devoted to material laws on elasticity, hyperelasticity and plasticity. A brief introduction to Computational Fluid Dynamics (CFD) is also included. The second half of this book presents a chapter on using tutorials containing information on code installation (on Windows) and getting started, and general hints on meshing, modelling and analysis. This is then followed by tutorials and exercises that cover linear, nonlinear and dynamic mechanical analysis, steady state and transient heat analysis, field analysis, fatigue, buckling and frequency analysis, a hydraulic pipe network analysis, and lastly two tutorials on CFD simulation. In each case theory is linked with application and exercises are included for further self-study. For these tutorials open source codes FreeCAD, CalculiX, FreeMAT and OpenFOAM are used. CalculiX is a comprehensive FE package covering linear, nonlinear and transient analysis. One particular benefit is that its format and structure is based on Abaqus, so knowledge gained is relevant to a leading commercial code. FreeCAD is primarily a powerful CAD modelling code, that includes good finite element meshing and modelling capabilities and is fully integrated with CalculiX. FreeMAT is used in three tutorials for numerical analysis demonstrating algorithms for explicit finite element and CFD analysis. And OpenFOAM is used for other CFD flow simulations. The primary aim of this book is to provide a unified text covering theory and practice, so a student can learn and experiment with these versatile and powerful analysis methods. It should be of value to both finite element courses and for student self-study.

The contributions gathered here provide an overview of current research projects and selected software products of the Fraunhofer Institute for Algorithms and Scientific Computing SCAI. They show the wide range of challenges that scientific computing currently faces, the solutions it offers, and its important role in developing applications for industry. Given the exciting field of applied collaborative research and development it discusses, the book will appeal to scientists, practitioners, and students alike. The Fraunhofer Institute for Algorithms and Scientific Computing SCAI combines excellent research and application-oriented development to provide added value for our partners. SCAI develops numerical techniques, parallel algorithms and specialized software tools to support and optimize industrial simulations. Moreover, it implements custom software solutions for production and logistics, and offers calculations on high-performance computers. Its services and products are based on state-of-the-art methods from applied mathematics and information technology.

Stress Field Control of Eruption DynamicsFrontiers Media SA

Jöbsis was the first to describe the in vivo application of near-infrared spectroscopy (NIRS), also called diffuse optical spectroscopy (DOS). NIRS was originally designed for the clinical monitoring of tissue oxygenation, and today it has also become a useful tool for neuroimaging studies (functional near-infrared spectroscopy, fNIRS). However, difficulties in the selective and quantitative measurements of tissue hemoglobin (Hb), which have been central in the NIRS field for over 40 years, remain to be solved. To overcome these problems, time-domain (TD) and frequency-domain (FD) measurements have been tried. Presently, a wide range of NIRS instruments are available, including commonly available commercial instruments for continuous wave (CW) measurements, based on the modified Beer–Lambert law (steady-state domain measurements). Among these measurements, the TD measurement is the most promising approach, although compared with CW and FD measurements, TD measurements are less common, due to the need for large and expensive instruments with poor temporal resolution and limited dynamic range. However, thanks to technological developments, TD measurements are increasingly being used in research, and also in various clinical settings. This Special Issue highlights issues at the cutting edge of TD DOS and diffuse optical tomography (DOT). It covers all aspects related to TD measurements, including advances in hardware, methodology, the theory of light propagation, and clinical applications.

Resistivity and induced polarization methods are used for a wide range of near-surface applications, including hydrogeology, civil engineering and archaeology, as well as emerging applications in the agricultural and plant sciences. This comprehensive reference text covers both theory and practice of resistivity and induced polarization methods, demonstrating how to measure, model and interpret data in both the laboratory and the field. Marking the 100 year anniversary of the seminal work of Conrad Schlumberger (1920), the book covers historical development of electrical

geophysics, electrical properties of geological materials, instrumentation, acquisition and modelling, and includes case studies that capture applications to societally relevant problems. The book is also supported by a full suite of forward and inverse modelling tools, allowing the reader to apply the techniques to a wide range of applications using digital datasets provided online. This is a valuable reference for graduate students, researchers and practitioners interested in near-surface geophysics.

Process Systems Engineering brings together the international community of researchers and engineers interested in computing-based methods in process engineering. This conference highlights the contributions of the PSE community towards the sustainability of modern society and is based on the 13th International Symposium on Process Systems Engineering PSE 2018 event held San Diego, CA, July 1-5 2018. The book contains contributions from academia and industry, establishing the core products of PSE, defining the new and changing scope of our results, and future challenges. Plenary and keynote lectures discuss real-world challenges (globalization, energy, environment and health) and contribute to discussions on the widening scope of PSE versus the consolidation of the core topics of PSE. Highlights how the Process Systems Engineering community contributes to the sustainability of modern society Establishes the core products of Process Systems Engineering Defines the future challenges of Process Systems Engineering

This book constitutes the refereed proceedings of the 13th European Conference on Evolutionary Computation in Combinatorial Optimization, EvoCOP 2013, held in Vienna, Austria, in April 2013, colocated with the Evo* 2013 events EuroGP, EvoBIO, EvoMUSART, and EvoApplications. The 23 revised full papers presented were carefully reviewed and selected from 50 submissions. The papers present the latest research and discuss current developments and applications in metaheuristics - a paradigm to effectively solve difficult combinatorial optimization problems appearing in various industrial, economic, and scientific domains. Prominent examples of metaheuristics are ant colony optimization, evolutionary algorithms, greedy randomized adaptive search procedures, iterated local search, simulated annealing, tabu search, and variable neighborhood search. Applications include scheduling, timetabling, network design, transportation and distribution, vehicle routing, the travelling salesman problem, packing and cutting, satisfiability, and general mixed integer programming.

The vast majority of control systems built today are embedded; that is, they rely on built-in, special-purpose digital computers to close their feedback loops. Embedded systems are common in aircraft, factories, chemical processing plants, and even in cars–a single high-end automobile may contain over eighty different computers. The design of embedded controllers and of the intricate, automated communication networks that support them raises many new questions—practical, as well as theoretical—about network protocols, compatibility of operating systems, and ways to maximize the effectiveness of the embedded hardware. This handbook, the first of its kind, provides engineers, computer scientists, mathematicians, and students a broad, comprehensive source of information and technology to address many questions and aspects of embedded and networked control. Separated into six main sections—Fundamentals, Hardware, Software, Theory, Networking, and Applications—this work unifies into a single reference many scattered articles, websites, and specification sheets. Also included are case studies, experiments, and examples that give a multifaceted view of the subject, encompassing computation and communication considerations.

This book discusses different aspects of energy consumption and environmental pollution, describing in detail the various pollutants resulting from the utilization of natural resources and their control techniques. It discusses diagnostic techniques in a simple and easy-to-understand manner. It will be useful for engineers, agriculturists, environmentalists, ecologists and policy makers involved in area of pollutants from energy, environmental safety, and health sectors.

Extracting information from seismic data requires knowledge of seismic wave propagation and reflection. The commonly used method involves solving linearly for a reflectivity at every point within the Earth, but this book follows an alternative approach which invokes inverse scattering theory. By developing the theory of seismic imaging from basic principles, the authors relate the different models of seismic propagation, reflection and imaging - thus providing links to reflectivity-based imaging on the one hand and to nonlinear seismic inversion on the other. The comprehensive and physically complete linear imaging foundation developed presents new results at the leading edge of seismic processing for target location and identification. This book serves as a fundamental guide to seismic imaging principles and algorithms and their foundation in inverse scattering theory, and is a valuable resource for working geoscientists, scientific programmers and theoretical physicists.

Urbanization is giving rise to environmental concerns including urban flooding, which generally occurs due to the construction of houses in the low-lying areas; loss of green cover leading to a disturbance in the ecological cycle; water scarcity due to growing needs; and deforestation leading to habitat fragmentation, wildlife corridors disturbance, forest fires, and climate change. In order to correct these issues, a consolidated balance between human, nature, and spatial aspects must be resolved and spatial solutions integrated on a common platform. Addressing Environmental Challenges Through Spatial Planning is devoted to addressing environmental concerns and technology innovations in domains such as pollution, water insecurity, and resources management. This text works to bridge the gap between engineering considerations and spatial aspects of planning. Covering topics such as sustainable housing, environmental restoration, and air emissions, this text is essential for environmental engineers, planning researchers, faculty, environmental and civil administrators, architects, consultants, environmental activists, town and country planning organizations, and professionals in all industries who aspire to have an environmentally friendly atmosphere and to provide a sustainable way of dealing with the environment in their respective domains for process efficiency and cost optimization.

Remote Sensing is of paramount importance for Earth Observation to monitor and analyze the Earth’s vital signs. In this Special Issue are reported the latest research results involving active optical remote sensing instruments, both from ground-based to satellite platforms, that are involved in analyzing the vertical and horizontal aerosol and cloud distribution, other than their geometrical, optical and microphysical properties. Those active optical remote sensing techniques are also very useful in determining pollutant dispersion and the dynamics inside the boundary layer. The published studies put in evidence the hidden mechanisms on how pollution from the source is advected transnationally in other countries and the interaction with local meteorology.