# Ansys Maxwell 2d 14 User Guide

Due to the increasing world population, energy consumption is steadily climbing, and there is a demand to provide solutions for sustainable and renewable energy production, such as wind turbines and photovoltaics. Power electronics are being used to interface renewable sources in order to maximize the energy yield, as well as smoothly integrate them within the grid. In many cases, power electronics are able to ensure a large amount of energy saving in pumps, compressors, and ventilation systems. This book explains the operations behind different renewable generation technologies in order to better prepare the reader for practical applications. Multiple chapters are included on the state-of-the-art and possible technology developments within the next 15 years. The book provides a comprehensive overview of the current renewable energy technology in terms of system configuration, power circuit usage, and control. It contains two design examples for small wind turbine system and PV power system, respectively, which are useful for real-life installation, as well as many computer simulation models.

The definitive guide to the ANSYS Parametric Design Language (APDL), the command language for the ANSYS Mechanical APDL product from ANSYS, Inc. PADT has converted their popular "Introduction to APDL" class into a guide so that users can teach themselves the APDL language at their own pace. Its 12 chapters include reference information, examples, tips and hints, and eight workshops. Topics covered include: - Parameters - User Interfacing - Program Flow - Retrieving Database Information - Arrays, Tables, and Strings - Importing Data - Writing Output to Files - Menu Customization

This book focuses on soft switching three-phase converters for applications such as renewable energy and distribution power systems, AC power sources, UPS, motor drives, battery chargers, and more. It begins with an introduction to fundamental of soft switching technology for three-phase conversion. The author provides basic knowledge of soft-switching technology to give readers necessary background information for the following subjects. The book goes on to describe applying soft-switching technology to three-phase rectifiers, then three-phase grid inverters. The author provides porotypes and expermients of each. Finally, the book investigates the impact of silicon carbide (SiC) devices on soft-switching three converters, studying the improvement of efficiency and power density by introducing SiC to soft-switching three-phase converters.

This book is based on the 55th International Conference of Machine Design Departments 2014 (ICMD 2014) which was hosted by the Czech Technical University in September 2014. It features scientific articles which solve progressive themes from the field of machine design. The book addresses a broad range of themes including tribology, hydraulics, materials science, product innovation and experimental methods. It presents the latest interdisciplinary high-tech work. People with an interest in the latest research results in the field of machine design and manufacturing engineering will value this book with contributions of leading academic scientists and experts from all around the world.

This reference illustrates the interaction and operation of transformer and system components and spans more than two decades of technological advancement to provide an updated perspective on the increasing demands and requirements of the modern transformer industry. Guiding engineers through everyday design challenges and difficulties such as stray loss estimation and control, prediction of winding hot spots, and calculation of various stress levels and performance figures, the book propagates the use of advanced computational tools for the optimization and quality enhancement of power system transformers and encompasses every key aspect of transformer function, design, and engineering.

As the availability of powerful computer resources has grown over the last three decades, the art of computation of electromagnetic (EM) problems has also grown - exponentially. Despite this dramatic growth, however, the EM community lacked a comprehensive text on the computational techniques used to solve EM problems. The first edition of Numerical Techniques in Electromagnetics filled that gap and became the reference of choice for thousands of engineers, researchers, and students. The Second Edition of this bestselling text reflects the continuing increase in awareness and use of numerical techniques and incorporates advances and refinements made in recent years. Most notable among these are the improvements made to the standard algorithm for the finite difference time domain (FDTD) method and treatment of absorbing boundary conditions in FDTD, finite element, and transmission-line-matrix methods. The author also added a chapter on the method of lines. Numerical Techniques in Electromagnetics continues to teach readers how to pose, numerically analyze, and solve EM problems, give them the ability to expand their problem-solving skills using a variety of methods, and prepare them for research in electromagnetism. Now the Second Edition goes even further toward providing a comprehensive resource that addresses all of the most useful computation methods for EM problems.

"...Ben has been the world-wide guru of this technology, providingsupport to applications of all types. His genius lies in handlingthe extremely complex mathematics, while at the same time seeingthe practical matters involved in applying the results. As thisbook clearly shows, Ben is able to relate to novices interested inusing frequency selective surfaces and to explain technical detailsin an understandable way, liberally spiced with his special brandof humor... Ben Munk has written a book that represents the epitomeof practical understanding of Frequency Selective Surfaces. Hedeserves all honors that might befall him for this achievement."-William F. Bahret. Mr. W. Bahret was with the United States Air Force but is nowretired. From the early 50s he sponsored numerous projectsconcerning Radar Cross Section of airborne platforms in particularantennas and absorbers. Under his leadership grew many of theconcepts used extensively today, as for example the metallicradome. In fact, he is by many considered to be the father ofstealth technology. "This book compiles under one cover most of Munk's research overthe past three decades. It is woven with the physical insight thathe has gained and further developed as his career has grown. Benuses mathematics to whatever extent is needed, and only as needed.This material is written so that it should be useful to engineerswith a background in electromagnetics. I strongly recommend thisbook to any engineer with any interest in phased arrays and/orfrequency selective surfaces. The physical insight that may begained from this book will enhance their ability to treataditional array problems of their own." -Leon Peters, Jr. Professor Leon Peters, Jr., was a professor at the Ohio StateUniversity but is now retired. From the early sixties he worked on,among many other things, RCS problems involving antennas andabsorbers. This book presents the complete derivation of the Periodic Methodof Moments, which enables the reader to calculate quickly andefficiently the transmission and reflection properties ofmulti-layered Frequency Selective Surfaces comprised of either wireand/or slot elements of arbitrary shape and located in a stratifiedmedium. However, it also gives the reader the tools to analyzemulti-layered FSS's leading to specific designs of the veryimportant Hybrid Radome, which is characterized by constant bandwidth with angle of incidence and polarization. Further, itinvestigates in great detail bandstop filters with large as wellasnarrow bandwidth (dichroic surfaces). It also discusses for thefirst time, lossy elements used in producing Circuit Analogabsorbers. Finally, the last chapter deals with power breakdown ofFSS's when exposed to pulsed signals with high peak power. The approach followed by most other presentations simply consistsof expanding the fields around the FSS, matching the boundaryconditions and writing a computer program. While this enables theuser to obtain calculated results, it gives very little physicalinsight and no help in how to design actual multi-layered FSS's. Incontrast, the approach used in this title analyzes all curves ofdesired shapes. In particular, it discusses in great detail how toproduce radomes made of FSS's located in a stratified medium(Hybrid Radomes), with constant band width for all angles ofincidence and polarizations. Numerous examples are given of greatpractical interest. More specifically, Chapter 7 deals with thetheory and design of bandpass radomes with constant bandwidth andflat tops. Examples are given for mono-, bi- and tri-planardesigns. Chapter 8 deals with bandstop filters with broad as wellas narrow bandwidth. Chapter 9 deals with multi-layered FSS oflossy elements, namely the so-called Circuit Analog Absorbers,designed to yield outstanding absorption with more than a decade ofbandwidth. Features material previously

labeled as classified by the UnitedStates Air Force.

A "wiggler" is an insertion device used for spatially concentrating radiation for research purposes, and an "undulator" is a multi-period wiggler. Undulator and wiggler devices are inserted in a free straight section of the storage ring of the synchrotron. This book explores the radiation produced by these insertion devices, the engineering and ass

Presents applied theory and advanced simulation techniques for electric machines and drives This book combines the knowledge of experts from both academia and the software industry to present theories of multiphysics simulation by design for electrical machines, power electronics, and drives. The comprehensive design approach described within supports new applications required by technologies sustaining high drive efficiency. The highlighted framework considers the electric machine at the heart of the entire electric drive. The book also emphasizes the simulation by design concept—a concept that frames the entire highlighted design methodology, which is described and illustrated by various advanced simulation technologies. Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives begins with the basics of electrical machine design and manufacturing tolerances. It also discusses fundamental aspects of the state of the art design process and includes examples from industrial practice. It explains FEM-based analysis techniques for electrical machine design—providing details on how it can be employed in ANSYS Maxwell software. In addition, the book covers advanced magnetic material modeling capabilities employed in numerical computation; thermal analysis; automated optimization for electric machines; and power electronics and drive systems. This valuable resource: Delivers the multi-physics know-how based on practical electric machine design methodologies Provides an extensive overview of electric machine design optimization and its integration with power electronics and drives Incorporates case studies from industrial practice and research and development projects Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives is an incredibly helpful book for design engineers, application and system engineers, and technical professionals. It will also benefit graduate engineering students with a strong interest in electric machines and drives.

Theory of Electromagnetic Well Logging provides a much-needed and complete analytical method for electromagnetic well logging technology. The book presents the physics and mathematics behind the effective measurement of rock properties using boreholes, allowing geophysicists, petrophysisists, geologists and engineers to interpret them in a more rigorous way. Starting with the fundamental concepts, the book then moves on to the more classic subject of wireline induction logging, before exploring the subject of LWD logging, concluding with new thoughts on electromagnetic telemetry. Theory of Electromagnetic Well Logging is the only book offering an in-depth discussion of the analytical and numerical techniques needed for expert use of those new logging techniques. Features in-depth analysis of the analytical and numerical techniques needed for expert use of logging techniques Includes software codes, providing a handy tool for understanding logging tool physics and design of new logging tools Provides a detailed glossary of all key terms within the introductory chapter

Unlike any other source in the field, this valuable reference clearly examines key aspects of the finite element method (FEM) for electromagnetic analysis of low-frequency electrical devices. The authors examine phenomena such as nonlinearity, mechanical force, electrical circuit coupling, vibration, heat, and movement for applications in the elect

This publication has been written to honour the contribution to science and education made by the Distinguished Professor Emeritus Professor Schey on his eightieth birthday. The contributors to his book are among the countless researchers who have read, studied and learned from Professor Schey's work, which includes books, research monographs, invited papers, keynote papers, scientific journals and conferences. The topics include manufacturing, sheet and bulk metal forming and tribology, amongst others. The topics included in this book include: John Schey and value-added manufacturing; Surface finish and friction in cold-metal rolling; Direct observation of interface for tribology in metal forming; An examination of the coefficient of friction; Studies on micro plasto hydrodynamic lubrication in metal forming; Numerical simulation of sheet metal forming; Geometric and mechanics model of sheet forming; Modelling and optimisation of metal forming processes; The mathematical modelling of hot rolling steel; Identification of rheological and tribological parameters; Oxide behaviour in hot rolling; Friction, lubrication and surface response in wire drawing; and Modelling and control of temper rolling and skin pass rolling.

This book is an introduction to the concepts and developments of emerging electric machines, including advances, perspectives, and selected applications. It is a helpful tool for practicing engineers concerned with emerging electric machines and their challenges and potential uses. Chapters cover such topics as electric machines with axial magnetic flux, asynchronous machines with dual power supply, new designs for electrical machines, and more.

???ANSYS14?????ANSYS??????????????????????????????????????????????ANSYS???????????????ANSYS?????ANSYS????????????????????????????????????????????????????????????????????????????????????????????????????????? GUI ???????????????????????????????????ANSYS????????????????????????????????????????????????????????????????????????????????????????????????????????????AVI???

This book provides a thorough guide to the use of numerical methods in energy systems and applications. It presents methods for analysing engineering applications for energy systems, discussing finite difference, finite element, and other advanced numerical methods. Solutions to technical problems relating the application of these methods to energy systems are also thoroughly explored. Readers will discover diverse perspectives of the contributing authors and extensive discussions of issues including: • a wide variety of numerical methods concepts and related energy systems applications;• systems equations and optimization, partial differential equations, and finite difference method;• methods for solving nonlinear equations, special methods, and their mathematical implementation in multi-energy sources;• numerical investigations of electrochemical fields and devices; and• issues related to numerical approaches and optimal integration of energy consumption. This is a highly informative and carefully presented book, providing scientific and academic insight for readers with an interest in numerical methods and energy systems.

This book features research presented at the 1st International Conference on Artificial Intelligence and Applied Mathematics in Engineering, held on 20–22 April 2019 at Antalya, Manavgat (Turkey). In today's world, various engineering areas are essential components of technological innovations and effective real-world solutions for a better future. In this context, the book focuses on problems in engineering and discusses research using artificial intelligence and applied mathematics. Intended for scientists, experts, M.Sc. and Ph.D. students, postdocs and anyone interested in the subjects covered, the book can also be used as a reference resource for courses related to artificial intelligence and applied mathematics.

This textbook demonstrates the application of the finite element philosophy to the solution of real-world problems and is aimed at graduate level students, but is also suitable for advanced undergraduate students. An essential part of an engineer's training is

the development of the skills necessary to analyse and predict the behaviour of engineering systems under a wide range of potentially complex loading conditions. Only a small proportion of real-life problems can be solved analytically, and consequently, there arises the need to be able to use numerical methods capable of simulating real phenomena accurately. The finite element (FE) method is one such widely used numerical method. Finite Element Applications begins with demystifying the 'black box' of finite element solvers and progresses to addressing the different pillars that make up a robust finite element solution framework. These pillars include: domain creation, mesh generation and element formulations, boundary conditions, and material response considerations. Readers of this book will be equipped with the ability to develop models of real-world problems using industry-standard finite element packages.

Gas Vapor Liquid Systems

ANSYS Mechanical APDL for Finite Element Analysis provides a hands-on introduction to engineering analysis using one of the most powerful commercial general purposes finite element programs on the market. Students will find a practical and integrated approach that combines finite element theory with best practices for developing, verifying, validating and interpreting the results of finite element models, while engineering professionals will appreciate the deep insight presented on the program's structure and behavior. Additional topics covered include an introduction to commands, input files, batch processing, and other advanced features in ANSYS. The book is written in a lecture/lab style, and each topic is supported by examples, exercises and suggestions for additional readings in the program documentation. Exercises gradually increase in difficulty and complexity, helping readers quickly gain confidence to independently use the program. This provides a solid foundation on which to build, preparing readers to become power users who can take advantage of everything the program has to offer. Includes the latest information on ANSYS Mechanical APDL for Finite Element Analysis Aims to prepare readers to create industry standard models with ANSYS in five days or less Provides self-study exercises that gradually build in complexity, helping the reader transition from novice to mastery of ANSYS References the ANSYS documentation throughout, focusing on developing overall competence with the software before tackling any specific application Prepares the reader to work with commands, input files and other advanced techniques

Intended for courses in Finite Element Analysis, this text presents the theory of finite element analysis. It explores its application as a design/modeling tool, and explains in detail how to use ANSYS intelligently and effectively.

Collection of selected, peer reviewed papers from the 2013 International Conference on Mechatronics, Robotics and Automation (ICMRA 2013), June 13-14, 2013, Guangzhou, China. Volume is indexed by Thomson Reuters CPCI-S (WoS). The 447 papers are grouped as follows: Chapter 1: Theory of Mechanisms and Dynamic Systems; Chapter 2: Design and Control in Modern Mechantronics System Engineering; Chapter 3: Robotics and Real World Applications; Chapter 4: Sensor, Actuator Technology and Wireless Sensor Networks Applications; Chapter 5: Fluid and Flow Engineering, Control Technology; Chapter 6: Voice, Image and Video Processing, Recognition Technologies; Chapter 7: Signal Processing Systems Design and Implementation; Chapter 8: Measurement, Detection and Monitoring, Testing and Instruments; Chapter 9: Artificial Intelligence Techniques and Optimization Algorithms; Chapter 10: Intelligent Control Systems, Automation and Power Engineering; Chapter 11: Electronics/Microelectronics and Embedded Systems; Chapter 12: Computer Applications in Industry and Engineering, Computational and Mathematical Methods and Modelling; Chapter 13: Materials and Processing Technologies; Chapter 14: Product Design and Manufacture; Chapter 15: Industrial Engineering, Management and Education Engineering Applications.

Wind energy's bestselling textbook- fully revised. This must-have second edition includes up-to-date data, diagrams, illustrations and thorough new material on: the fundamentals of wind turbine aerodynamics; wind turbine testing and modelling; wind turbine design standards; offshore wind energy; special purpose applications, such as energy storage and fuel production. Fifty additional homework problems and a new appendix on data processing make this comprehensive edition perfect for engineering students. This book offers a complete examination of one of the most promising sources of renewable energy and is a great introduction to this cross-disciplinary field for practising engineers. "provides a wealth of information and is an excellent reference book for people interested in the subject of wind energy." (IEEE Power & Energy Magazine, November/December 2003) "deserves a place in the library of every university and college where renewable energy is taught." (The International Journal of Electrical Engineering Education, Vol.41, No.2 April 2004) "a very comprehensive and well-organized treatment of the current status of wind power." (Choice, Vol. 40, No. 4, December 2002)

The switched reluctance machine (SRM) is the least expensive electrical machine to produce, yet one of the most reliable. As such, research has blossomed during the last decade, and the SRM and variable drive systems using SRMs are receiving considerable attention from industry. Because they require a power electronic converter and controller to function, however, successful realization of an SRM variable drive system demands an understanding of the converter and controller subsystems and their integration with the machine. Switched Reluctance Motor Drives provides that understanding. It presents a unified view of the machine and its drive system from all of its system and subsystem aspects. With a careful balance of theory and implementation, the author develops the analysis and design of SRMs from first principles, introduces a wide variety of power converters available for driving the SRM, and systematically presents both low- and high-performance controllers. The book includes an in-depth study of acoustic noise and its minimization along with application examples that include comparisons between ac and dc drives and SRM drive. The result is the first book that provides a state-of-the-art knowledge of SRMs, power converters, and their use with both sensor-based and sensorless controllers. Switched Reluctance Motor Drives enables both students and engineers to learn all aspects of SRM drive systems and appreciate the interdependence of the various subsystems in performance optimization.

This book presents an efficient and robust method of modelling the magnetostatic properties of different technical elements, especially thin layers for magnetic sensors. The solutions presented utilise the principles of the method of moments. However, the principles have been developed both from the point of view of physical analyses as well as from the point of view of numerical optimisation. To enable cost-efficient use of the solutions for commercial applications in industry, the proposed method was implemented as a code optimised for use in the open-source OCTAVE environment. The scripts can be also used with MATLAB software, which is more user friendly, especially for less experienced users.

This book comprises the proceedings of the Conference and Exhibition on Non Destructive Evaluation, (NDE 2019). The contents of the book encompass a vast spectrum from Conventional to Advanced NDE including novel methods, instrumentation, sensors, procedures and data analytics as applied to all industry segments for quality control, periodic maintenance, life estimation, structural integrity and related areas. This book will be a useful reference for students, researchers and practitioners.

This book on hybrid electric vehicles brings out six chapters on some of the research activities through the wide range of current issues on hybrid electric vehicles. The first section deals with two interesting applications of HEVs, namely, urban buses and heavy duty working machines. The second one groups papers related to the optimization of the electricity flows in a hybrid electric vehicle, starting from the optimization of recharge in PHEVs through advance storage systems, new motor technologies, and integrated starter-alternator technologies. A comprehensive analysis of the technologies used in HEVs is beyond the aim of the book. However, the content of this volume can be useful to scientists and students to broaden their knowledge of technologies and application of hybrid electric vehicles.

Finite element analysis has been widely applied to study biomedical problems. This book aims to simulate some common medical problems using finite element advanced technologies, which establish a base for medical researchers to conduct further investigations. This book consists of four main parts: (1) bone, (2) soft tissues, (3) joints, and (4) implants. Each part starts with the structure and function of the biology and then follows the corresponding finite element advanced features, such as anisotropic nonlinear material, multidimensional interpolation, XFEM, fiber enhancement, UserHyper, porous media, wear, and crack growth fatigue analysis. The final section presents some specific biomedical problems, such as abdominal aortic aneurysm, intervertebral disc, head impact, knee contact, and SMA cardiovascular stent. All modeling files are attached in the appendixes of the book. This book will be helpful to graduate students and researchers in the biomedical field who engage in simulations of biomedical problems. The book also provides all readers with a better understanding of current advanced finite element technologies. Details finite element modeling of bone, soft tissues, joints, and implants Presents advanced finite element technologies, such as fiber enhancement, porous media, wear, and crack growth fatigue analysis Discusses specific biomedical problems, such as abdominal aortic aneurysm, intervertebral disc, head impact, knee contact, and SMA cardiovascular stent Explains principles for modeling biology Provides various descriptive modeling files

Practical Stress Analysis with Finite Elements is an ideal introductory text for newcomers to finite element analysis who wish to learn how to use FEA. Unlike many other books which claim to be at an introductory level, this book does not weigh the reader down with theory but rather provides the minimum amount of theory needed to understand how to practically perform an analysis using a finite element analysis software package. Newcomers to FEA generally want to learn how to apply FEA to their particular problem and consequently the emphasis of this book is on practical FE procedures. The information in this book is an invaluable guide and reference for both undergraduate and postgraduate engineering students and for practising engineers. * Emphasises practical finite element analysis with commercially available finite element software packages. * Presented in a generic format that is not specific to any particular finite element software but clearly shows the methodology required for successful FEA. * Focused entirely on structural stress analysis. * Offers specific advice on the type of element to use, the best material model to use, the type of analysis to use and which type of results to look for. * Provides specific, no nonsense advice on how to fix problems in the analysis. * Contains over 300 illustrations * Provides 9 detailed case studies which specifically show you how to perform various types of analyses. Are you tired of picking up a book that claims to be on "practical" finite element analysis only to find that it is full of the same old theory rehashed and contains no advice to help you plan your analysis? If so then this book is for you! The emphasis of this book is ondoing FEA, not writing a FE code. A method is provided to help you plan your analysis, a chapter is devoted to each choice you have to make when building your model giving you clear and specific advice. Finally nine case studies are provided which illustrate the points made in the main text and take you slowely through your first finite element analyses. The book is written in such a way that it is not specific to any particular FE software so it doesn't matter which FE software you use, this book can help you!

This is the first truly comprehensive and most up-to-date handbook available on modern reflector antennas and feed sources for diversified space and ground applications. There has never been such an all-encompassing reflector handbook in print, and no currently available title offers coverage of such recent research developments. The Handbook consists of three volumes. Volume III focuses on the range of reflector antenna applications, including space, terrestrial, and radar. The intent of this book volume is to provide practical applications and design information on reflector antennas used for several communications systems. This book covers recent developments of reflector antennas used for satellite communications, terrestrial communications, and remote sensing applications. New subjects are introduced for the first time, including satellite antennas, Terahertz antennas, PIM, multipaction, corona, deployable mesh reflector antennas, and mechanical aspects of reflector antennas. In addition, this book contains a separate topic on integrated feed assembly for reflector antennas covering analysis, design, fabrication, and test.

A comprehensive text, combining all important concepts and topics of Electrical Machines and featuring exhaustive simulation models based on MATLAB/Simulink Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink provides readers with a basic understanding of all key concepts related to electrical machines (including working principles, equivalent circuit, and analysis). It elaborates the fundamentals and offers numerical problems for students to work through. Uniquely, this text includes simulation models of every type of machine described in the book, enabling students to design and analyse machines on their own. Unlike other books on the subject, this book meets all the needs of students in electrical machine courses. It balances analytical treatment, physical explanation, and hands-on examples and models with a range of difficulty levels. The authors present complex ideas in simple, easy-to-understand language, allowing students in all engineering disciplines to build a solid foundation in the principles of electrical machines. This book: Includes clear elaboration of fundamental concepts in the area of electrical machines, using simple language for optimal and enhanced learning Provides wide coverage of topics,

aligning with the electrical machines syllabi of most international universities Contains extensive numerical problems and offers MATLAB/Simulink simulation models for the covered machine types Describes MATLAB/Simulink modelling procedure and introduces the modelling environment to novices Covers magnetic circuits, transformers, rotating machines, DC machines, electric vehicle motors, multiphase machine concept, winding design and details, finite element analysis, and more Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink is a well-balanced textbook perfect for undergraduate students in all engineering majors. Additionally, its comprehensive treatment of electrical machines makes it suitable as a reference for researchers in the field.

This book contains the edited versions of the papers presented at the Second International Workshop on Electric and Magnetic Fields held at the Katholieke Universiteit van Leuven (Belgium) in May 1994. This Workshop deals with numerical solutions of electromagnetic problems in real life applications. The topics include coupled problems (thermal, mechanical, electric circuits), CAD & CAM applications, 3D eddy current and high frequency problems, optimisation and application oriented numerical problems. This workshop was organised jointly by the AIM (Association of Engineers graduated from de Montefiore Electrical Institute) together with the Departments of Electrical Engineering of the Katholieke Universiteit van Leuven (Prof. R. Belmans), the University of Gent (Prof. J. Melkebbek) and the University of Liege (Prof. W. Legros). These laboratories are working together in the framework of the Pole d'Attraction Interuniversitaire - Inter-University Attractie-Pole 51 - on electromagnetic systems led by the University of Liege and the research work they perform covers most of the topics of the Workshop. One of the principal aims of this Workshop was to provide a bridge between the electromagnetic device designers, mainly industrialists, and the electromagnetic field computation developers. Therefore, this book contains a continuous spectrum of papers from application of electromagnetic models in industrial design to presentation of new theoretical developments.

This practical guide provides a comprehensive survey of all relevant inductive sensor classes for industrial applications in a single volume, from automotive use to white goods, covering design, fabrication, implementation, principles and functionality as well as standards and EMC requirements. The book addresses professional engineers and technicians, but is also accessible to students who require a solid basic knowledge of inductive sensors. Each chapter begins with classic, traditional explanations and gradually moves on to state-of- the art analog and digital solutions, including large-scale integrated systems-on-chip, software defined sensors SDS, digital signal synthesis, coils on silicon and active inductors. The book employs three modern analysis methods: analytic computation; popular graphical methods (phasor diagrams, phase plans, Smith charts, etc.) and computer assisted tools, like the electromagnetic field simulator, Maxwell, and the popular Spice simulator for electronic circuits. For traditional solutions, the chapters give overviews in tables with computation formulae (including empirical expressions). Numerical examples help the reader consolidate the theoretical knowledge gained. Concrete examples for currently available commercial parts are provided. Spotlight on Modern Transformer Design introduces a novel approach to transformer design using artificial intelligence (AI) techniques in combination with finite element method (FEM). Today, AI is widely used for modeling nonlinear and large-scale systems, especially when explicit mathematical models are difficult to obtain or completely lacking. Moreover, AI is computationally efficient in solving hard optimization problems. Many numerical examples throughout the book illustrate the application of the techniques discussed to a variety of real-life transformer design problems, including: • problems relating to the prediction of no-load losses; • winding material selection; • transformer design optimisation; • and transformer selection. Spotlight on Modern Transformer Design is a valuable learning tool for advanced undergraduate and graduate students, as well as researchers and power engineering professionals working in electric utilities and industries, public authorities, and design offices.