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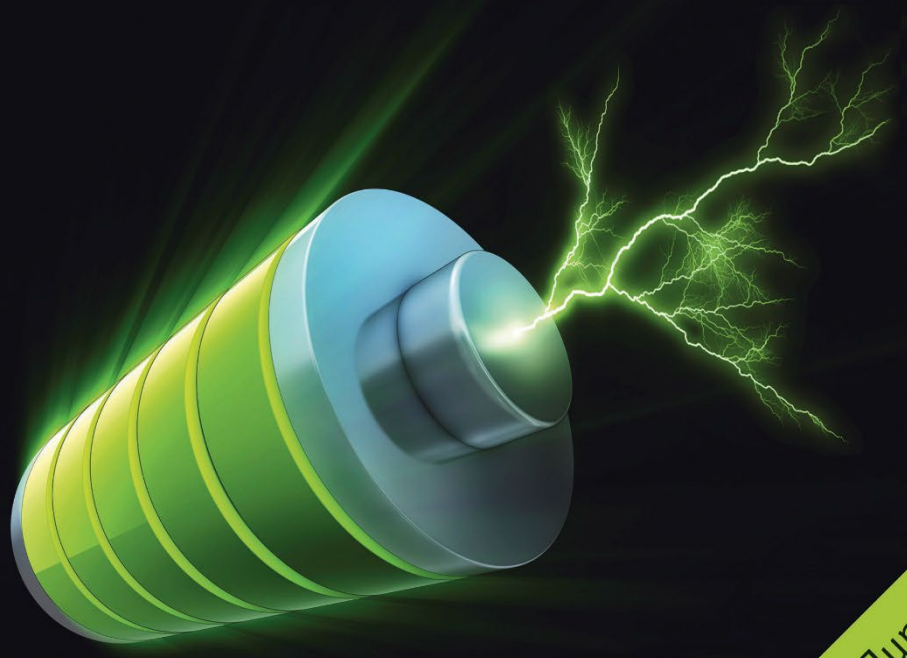
Business
IT
Engineering



January – June
2024

Authentication and authorization in IT

Fundamentals and concepts

ISBN: 978-3-446-47949-4
Pages: **116**
Publication date: **February 2024**

The correct use of authentication and authorization is playing an increasingly important role in the IT security of all companies

The book describes various methods of authentication and authorization in the context of operational information systems. The starting point is the problem that data and information, data flows and information flows must be protected both locally and in the network. The book identifies several areas and protective measures, how these can be combined and how they can be implemented on the basis of existing technologies. Potential implementation patterns are also described.

You will learn how you can protect data, particularly in the context of the GDPR and the ever-increasing distribution based on cloud-native architectures. It is no longer sufficient to implement a simple user login; instead, more or less extensive and very fine-meshed security mechanisms must be implemented at various levels depending on the criticality.

- explains the basics of authentication and authorization
- explained on the basis of practical use cases
- the sensible solution options explained
- effective combinations and decision paths described
- little to no prior knowledge required

FROM THE CONTENT //

Protecting resources/Use cases/OpenID/OAuth 2.0/OpenID Connect/JSON Web

People and information security

Understanding behavior, promoting awareness, recognizing human hacking

ISBN: 978-3-446-47645-5
Pages: **204**
Publication date: **January 2024**

People as threats and victims in IT security

With increasing digitalization, dependence on information technology is growing in all areas of life and information security is no longer in the hands of a few people with in-depth technical expertise. All users must be able to handle digital services responsibly and be aware of possible dangers and sources of error. For this reason, the importance of the "human factor" for information security has risen sharply in recent years.

This book explains this importance using various facets. It shows how people can be integrated as part of holistic information security management in organizations. People are characterized in various roles as attackers, insiders, those responsible, targets or role models. It shows how employees in companies can actually be sensitized and trained to handle IT responsibly. The book translates sound scientific findings, e.g. from psychology, into applicable concepts and uses numerous examples to show what really works in practice.

FROM THE CONTENT //

- The human factor in information security: from "problem" to "solution"
- Humans as a threat: insider threats
- Humans as victims of human hacking
- Behavioral intention, knowledge, habit and salience as factors of information security awareness
- Promoting information security awareness in a targeted manner
- Evaluating and measuring information security awareness

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Hacking with Post Exploitation Frameworks

Understand and prevent attacks, create awareness

ISBN: 978-3-446-47872-5
Pages: **296**
Publication date: **September 2023**

The threat of hacker attacks is increasing in all industries, effective security measures are becoming more and more important!

- Describes attack methods to obtain critical information after a network has been penetrated.
- Explains frameworks for different purposes
- Provides measures to protect systems and networks
- Includes practical tips for getting started, as well as step-by-step instructions and background information

To respond effectively to complex cyber attacks, it is essential to know the latest adversary attack techniques. Because only then can you take the appropriate defensive measures in time. This is where post exploitation comes into play. It is a phase of penetration testing that presupposes that a connection already exists between attackers and the target IT.

This book covers the installation and use of post exploitation frameworks. These will help you simulate possible attack scenarios in a secure environment and check systems for existing and potential vulnerabilities. Digitization has become a strategic competitive factor. Even though the digital transformation is affecting all industries at different speeds, no industry can escape this development. To remain competitive, companies must take advantage of the digital transformation and its opportunities. Digital transformation does not just affect IT managers, but is a task for the entire company.

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IT-Management

Business analysis - simple and effective

Understanding business requirements and implementing them in IT solutions

ISBN: 978-3-446-47396-6
Pages: **364**
Publication date: **March 2024**

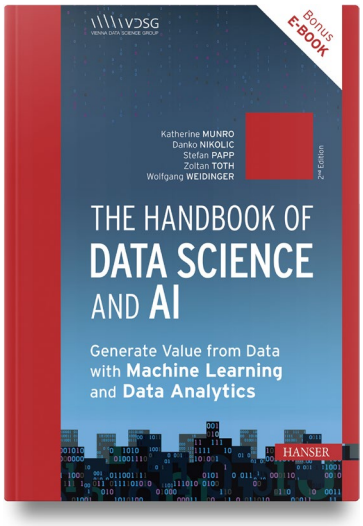
Basics and best practices for carrying out the business analysis

- Systematic and consistent presentation of the activities of business analysis and the discipline of demand management
- Strategic, tactical and operational planning levels in their interaction
- Consistent practical example
- Collection of best practices for business analysis and tool support as well as organizational anchoring of demand management
- Detailed description of the types of business analysis results with tips and tricks for use, including a business case analysis
- Step-by-step instructions for deriving business services

Companies need to be able to change and adapt quickly to market and economic conditions. The activity of business analysis and its organizational anchoring in demand management are key success factors for this. The necessary changes are recognized, professionally designed and implemented. The project portfolio as well as the individual projects and maintenance measures are aligned with business requirements and productivity during implementation is increased. The number and scope of business requirements are significantly reduced by checking their benefits, consistency and importance at an early stage. Unnecessary duplication of work and value-destroying projects are avoided. This frees up time for strategic projects. In this book, we provide the basics and best practices for carrying out business analysis and help you to bring demand management to life with a classic and agile approach.

FROM THE CONTENT //
Introduction/Introduction to business analysis/From business requirements to IT projects/Best practices in business analysis/Types of business analysis results/Business capability management & business services

AI



The Handbook of Data Science and AI

Generate Value from Data with Machine Learning and Data Analytics

2nd updated and extended edition

ISBN: 978-1-56990-934-8
Pages: **672**
Publication date: **July 2024**

In English language

A comprehensive overview of the various application areas of data science

Data Science, Big Data and Artificial Intelligence are currently some of the most talked-about concepts in industry, government, and society, and yet also the most misunderstood. This book will clarify these concepts and provide you with practical knowledge to apply them.
Featuring:
The book approaches the topic of data science from several sides. Crucially, it will show you how to build data platforms and apply data science tools and methods. Along the way, it will help you understand - and explain to various stakeholders - how to generate value from these techniques, such as applying data science to help organizations make faster decisions, reduce costs, and open up new markets. Furthermore, it will bring fundamental concepts related to data science to life, including statistics, mathematics, and legal considerations. Finally, the book outlines practical case studies that illustrate how knowledge generated from data is changing various industries over the long term.

- Mathematics basics: Mathematics for Machine Learning to help you understand and utilize various ML algorithms.
- Machine Learning: From statistical to neural and from Transformers and GPT-4 to AutoML, we introduce common frameworks for applying ML in practice
- Natural Language Processing: Tools and techniques for gaining insights from text data and developing language technologies
- Computer vision: How can we gain insights from images and videos with data science?
- Modeling and Simulation: Model the behavior of complex systems and do a What-If analysis covering different scenarios.
- ML and AI in production: How to turn experimentation into a working data science product?

AI and the disruption of work

Active beyond the job and routine

ISBN: 978-3-446-46272-4
Pages: **410**
Publication date: **July 2023**

Profound analysis of possible effects of digitalization and artificial intelligence on the world of work

Artificial intelligence will fundamentally change the world of work. It is already becoming apparent what this technology is capable of, but it is nothing compared to what awaits us in the future. Should we be afraid of these changes or should we welcome them? Are we really helplessly at the mercy of an unstoppable force? No, because after all, we are also the ones who have brought about this development. This book will help you evaluate what you fear by putting the upcoming changes on a solid footing. It shows where we are coming from in order to better understand where we are going, or better yet, where we should want to go in order to willfully shape our future.

Klaus Kornwachs uses scenarios to look at the fields in the world of work where the greatest AI-induced upheavals are to be expected, and shows that major disruptions have often taken place in the past as well. You will learn what today's developments mean and learn how to classify them without rashly proclaiming a new age.

At the same time, a possible working world of the future is being sketched out. This working world will probably consist of more creative, less routine activities. The present employer-employee relationship will change in the direction of a freely designed assumption of tasks, i.e., toward activities instead of jobs. This is not a forecast, but a possible spectrum of what we might want from the foreseeable consequences of technology development. There are always several alternatives here. To find out what we want, it is worth looking at the meaning of work as part of human existence. Here, too, there are completely different views, which Klaus Kornwachs will show you.

After reading this book, some of the current discussion about the impact of AI on the world of work will seem exaggerated to you. You will better understand where the limits of AI are, where our limits are, which we can overcome with AI and where we have to set limits for ourselves.

Cloud-native Computing

Software engineering of services and applications for the cloud

ISBN: 978-3-446-47914-2
Pages: **392**
Publication date: **December 2023**

Practical knowledge for the introduction of cloud-native technologies in companies

- Fundamentals of cloud computing (service models and cloud economics)
- The everything-as-code paradigm (DevOps, deployment pipelines, IaC)
- Automating system operation with container orchestration
- Understanding microservice and serverless architectures and designing cloud-native architectures with domain-driven design

Markets are changing ever faster, customer requirements are taking center stage - many companies are facing challenges that can only be mastered digitally. The use of cloud-native technologies is the best way to meet these requirements. However, it is not enough to simply create an account with a cloud provider. It is also important to understand the various factors that influence the success of cloud-native projects.

The book examines the cloud-native transformation from different perspectives: from corporate culture, the cloud economy and customer involvement (co-creation) to project management (agility) and software architecture through to quality assurance (continuous delivery), operations (DevOps) and security. Real-life practical examples will be used to show what went well and what went badly during implementation in different industries and what best practices can be derived from this. The migration of legacy code is also taken into account.

This book also provides IT architects with the basic knowledge they need to introduce cloud-native technologies and the DevOps culture in their project or throughout the entire company.

RFID Handbook

Basics and practical applications of transponders, contactless smart cards and NFC

ISBN: 978-3-446-44885-8
Pages: **800**, 8th Ed.
Publication date: **September 2023**

The only fundamental book of RFID

- Here you will find everything you need to know about the technical and physical basics as well as the possible applications of RFID.
- You will learn about the structure of electronic data carriers and readers, the structure of data formats and methods for maintaining data integrity.
- You will be informed about possible attacks on RFID systems and defensive measures.
- You will receive an overview of approval regulations and the current status of standardization.
- **This 8th edition of the RFID Handbook celebrates its 25th anniversary**.

RFID is omnipresent. Whether paying at the till, with an NFC cell phone or contactless bank card, as an access pass to businesses and hotel rooms, as a contactless ticket for local public transport, as electronic theft protection, in logistics or retail, in electronic passports or as a cat or dog chip: The possible applications of battery-free, electronic data carriers (transponders), which can be read without contact, seem almost limitless. This unique handbook offers a practical and comprehensive overview of the basics and technologies of RFID systems. **In the eighth edition**, you will find new information on RFID in retail, animal identification, tickets in public transportation and access systems. The chapters on the ISO/IEC 18000-63 standards, RAIN RFID, the GS1 EPC specifications and transponder security have been updated. Also new is a comprehensive chapter on NFC data structures (NDEF) and NFC tag types. Numerous illustrations illustrate the complex content and the application examples show you the possible uses of RFID in practice.

Klaus Finkenzeller works as an innovation manager at ELATEC, a manufacturer of RFID readers. He has also been involved in the development of standards for RFID systems and contactless chip cards in DIN and ISO since 1994. He has registered numerous patents and published specialist literature on the subject of RFID.

Database

Database systems

A practical introduction

ISBN: 978-3-446-46754-5
Pages: **504**
Publication date: **October 2024**

An ideal textbook for a basic and well-founded introduction to the subject of databases and database systems

The topics covered include:

- The relational model
- Data Query Language (SQL DQL)
- Data Manipulation Language (SQL DML)
- Database design
- Data Definition Language (SQL DDL)
- Extensions in SQL
- Database application development
- Structure and functionality of database management systems
- NoSQL databases

The teaching and learning content is presented in a structured, easy-to-understand and practically relevant way, using a consistent example that can be reviewed and practiced with e-learning modules.

At **plus.hanser-fachbuch.de** you will find free exercises with sample solutions for this title. In addition, there is an extensive e-learning offer for each chapter, in which the material in the book can be repeated in the form of tests (SQL trainer, multiple-choice test and other materials).

Decker machine elements

Function, design and calculation

ISBN: 978-3-446-47230-3
Page: **1.048**
Publication date: **December 2023**

STANDARD WORK

This textbook, which has been tried and tested for decades, presents the most important machine elements in a compact and easy-to-understand form.

It is therefore equally suitable for engineering students at master craftsman and technician schools, vocational academies, colleges and universities. It is also aimed at engineers and technicians in training and at work.

Each group of machine elements is dealt with in a self-contained manner so that the respective areas can be worked through independently of each other. The structure of the book is as follows:

- Non-detachable connections
- Detachable connections
- Rotary motion elements
- Gear wheels
- Enveloping drives
- Guide elements for liquids and gases

The authors attach great importance to the derivation of the equations. Important equations are highlighted visually and explained using numerous practical calculation examples. The presentation and practical application of modern calculation methods such as the transfer method for beams and shafts, finite element analysis and multi-mass torsional vibration calculation are unique and conceptually innovative. The 21st edition takes into account the current state of the art and impresses with a new layout and a full-color layout. In addition, over 250 comprehension questions have been added to help students internalize the most important learning objectives. The accompanying volume of tables, which can also be used independently of the textbook, provides useful overviews of figures and diagrams.

Design of machine elements

Formulas, application tips, calculation programs

ISBN: 978-3-446-47975-3
Pages: **567**
3rd revised Ed.
Publication date: **June 2024**

Practical book for successful calculation of machine elements

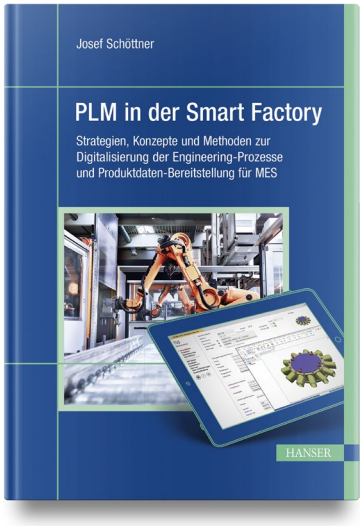
The practical book quickly and easily provides the essential ingredients for a calculation: the right formula and the standard-compliant characteristic values.

Among other things, the book contains

- over 100 material tables
- over 400 design drawings
- Practical tips with advantages and disadvantages of certain solutions; this gives you confidence when making a decision

At **plus.hanser-fachbuch.de** there are also 42 Excel calculation tools with clearly structured input and output masks, graphical representations of the machine elements and expandable material tables.

The **3rd edition** of the book is a comprehensive reference work for all design practitioners.



PLM in the Smart Factory

Strategies, concepts and methods for the digitalization of engineering processes and product data provision for MES

ISBN: 978-3-446-47962-3
Pages: **800**
Publication date: **May 2024**

Supports the introduction of Product Data Management (PDM) and Product Lifecycle Management (PLM)

Digital engineering, digital twins and digital factories are innovative concepts for making the ever-increasing complexity of products manageable. To achieve this, product-relevant information, data, processes and systems must be made available across the board. Product Lifecycle Management (PLM) forms the indispensable basis for this. Using a product data management (PDM) system, the IT integration concept ensures that product, process and project data is managed in a structured manner and, if required, made available in real time in a complete, up-to-date and consistent manner.
This practical guide shows how a company's product lifecycle management and design methodology should be designed in order to successfully implement the development of customized products and the management of cyber-physical production systems. It is aimed at product developers and planners, production planners, quality and project managers and IT managers.

The book covers the following topics, among others:

- Product configuration as an enabler of mass customization
- Digital engineering methods such as part standardization (repeat part development), product modularization and modular design (variant technology)
- Introduction of a new type of data and process model to build the virtual product, definition of requirements for the virtual product to manage the digital twin
- Strategies for implementing an integral PLM work platform for the realization of Digital Twin & Smart Factory

Anyone looking for future-proof design methods and PDM/PLM concepts will find numerous tried-and-tested recommendations from the author's 30 years of consulting experience in this book.

Human-robot collaboration handbook

ISBN: 978-3-446-47411-6
Pages:**504**
Publication date: **December 2023**

Cooperation between humans and robots - possibilities, goals, limits

Any use of robots only makes sense if it benefits people. The benefit of a robot comes from its ability to free us from work that we cannot or do not want to do. Human-robot cooperation is about workplaces where humans work directly with a robot without separating protective devices. This combines, for example, the greater flexibility of the human with the greater endurance and precision of the machine. This handbook describes all the important aspects that play a role in the use of collaborative robots:

- The business and competitive environment - Where and when is the use of collaborative robots even worthwhile?
- The existing machinery in the company - do robots fit in or do you need to plan for additional investment?
- Occupational safety - Are robots safe under all circumstances?
- Technology - What types are available, what control concepts are there?
- Production processes - How can robots be successfully integrated at all levels without putting people at a disadvantage?

Numerous examples from various industries show the different application scenarios of collaborative industrial robots. **There are numerous updates in the 2nd edition**:

- New applications and safety strategies
- Further development of sensor technology and programming
- Improved coupling of the digital twin
- significantly expanded models of human-robot interaction
- New approaches to commissioning and reprogramming
- AI support

This book is a must for anyone who wants to use robots for a versatile production environment beyond mass production.

Gripper during robot use

The fascination of automating handling tasks

ISBN: 978-3-446-47961-6
Pages: **360**
Publication date: **July 2024**

Practice-oriented introduction to gripper technology and robot movement

Automated gripping and handling processes offer great potential for rationalization, but are not always easy to implement in practice. This book shows how safe projects can be created when the right components and the necessary application know-how work together. It is aimed at users in production as well as machine and plant manufacturers.

The richly illustrated book presents all important aspects of handling processes - from the basic conditions of the gripping process to the history of automation and the starting point of the process, the workpiece. It defines the boundary conditions and initial situation of the process and shows how the movement follows the gripping. The realization of simple linear movements through to multi-axis kinematics is explained in a practical manner.

A spectrum of realized applications shows the variety of possible uses of automation in practice. Examples show that automation technology plays a role in the automotive, electrical and plastics industries as well as in the food sector. The application examples are woven into the text at the relevant point in the relevant specialist area..

Electrical drive technology

4th, updated edition

ISBN: 978-3-446-47911-1

Pages: **344**

Publication date: **January 2024**

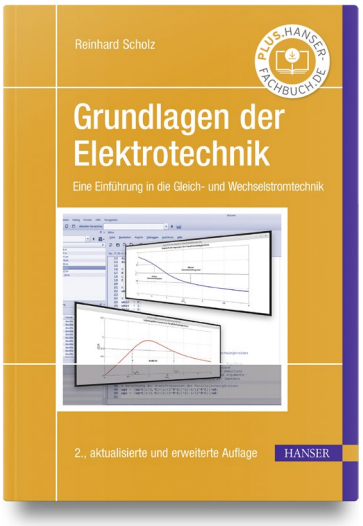
Comprehensive overview of the structure and mode of operation of electric drives

This textbook provides a comprehensive overview of the structure and mode of operation of electric drives. It shows how drives can be optimized in terms of productivity, costs, installation space and energy efficiency. Numerous pictures and exercises illustrate the subject matter and serve to deepen knowledge.

To make it easier to get started in this complex subject area, the book begins by focusing on the requirements for electric drives and their main distinguishing features. The tasks of individual components such as motors, mechanical transmission elements or position measuring devices are described, basic relationships are worked out and important terms relating to product information are explained. In the main section, common motors used in production machine drives, such as DC, stepper, synchronous and asynchronous motors, are explained. The servo drive technology section describes fundamental relationships.

For the new edition, the textbook has been updated and expanded to include energy efficiency topics.

The practical and easy-to-understand structure enables readers to acquire or expand their knowledge in the field of electrical drive technology. The textbook is aimed at students of automation technology, electrical engineering, medical technology, mechatronics, mechanical engineering and other related courses.



Fundamentals of electrical engineering

An introduction to DC and AC technology
2nd, updated and expanded edition
ISBN: 978-3-446-47936-4
Pages: **280**
Publication date: **May 2024**

What does electricity look like? Electricity explained easily!

Electrical engineering plays an important role in almost all engineering sciences. This textbook teaches its elementary basics, which are essential for many degree courses. After working through the book, readers will be able to analyze electrical circuits and treat them mathematically.

After a brief insight into the basics of physics, the textbook focuses on technical aspects from a user's perspective. The focus is on analyzing passive electrical circuits using modern computer-aided methods. With the help of circuit diagrams, readers gain an initial insight into the representation of electrical networks and their mathematical description using Kirchhoff's rules and Ohm's law. Particular attention is paid to the treatment of alternating current technology; direct current technology is considered as a special case of alternating current technology. The mathematics program "Octave" is used to calculate the examples and work through the exercises.
For the new edition, the compact textbook has been expanded to include a chapter on switch-on and transient processes. Valuable additional materials such as solutions, additional exercises and Octave programs are available at plus.hanser-fachbuch.de

From the contents:

- Electricity and magnetism
- Time-dependent quantities
- Components and basic circuits
- Frequency-selective circuits
- Power and work
- Linear electrical networks
- Introduction to network theory

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Electrical engineering for engineers

Components and basic circuits with MicroCap and LTspice

ISBN: 978-3-446-47706-3
Pages: **370**, 2nd revised and expanded edition
Publication date: **September 2024**

Provides basic knowledge of operating principles, characteristics, characteristic curves and equivalent circuits of electronic components

This textbook provides the necessary knowledge about operating principles, characteristics, characteristic curves and equivalent circuits and explains them clearly and comprehensibly using the example of the simulation of MicroCap models of the following components:

- Basic components: Resistor, capacitor, coil, transformer
- Homogeneous semiconductors and semiconductor diodes
- unipolar and bipolar transistors, thyristors
- optoelectronic components
- operational amplifiers.

The practical use of each component is described using typical basic circuits as examples. In addition to explaining the principle of operation, the focus is on dimensioning and functional testing using a MicroCap simulation.
The practical use of each component is described using typical basic circuits as examples. In addition to explaining the principle of operation, the focus is on dimensioning and functional testing using a MicroCap simulation.

This textbook is suitable as a textbook for technical courses at technical colleges and universities. Numerous teaching and simulation examples promote the consolidation and consolidation of the subject matter in exercises and self-study.

In the 2nd edition, all PSpice examples in the book have been converted to MicroCap. On plus.hanser-fachbuch.de the most meaningful simulation examples are also available with LTspice.

Mobile and stationary low-voltage direct current grids

Structure - Switching - Dimensioning - Protection

ISBN: 978-3-446-47997-5

Pages: **378**

Publication date: **March 2024**

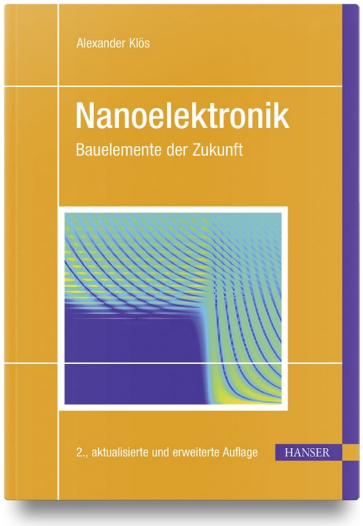
Provides an introduction to the structure, design and operation of low-voltage direct current networks

Not only small appliances such as televisions and PCs work with direct current, but data centers and production facilities are also increasingly using it. However, as devices and systems have so far been powered by alternating current, a prior conversion is required, which is associated with energy losses. The increasing use of renewable energy sources such as solar energy, which generate directly usable direct current, means that direct current is increasingly being proclaimed as the power supply of the future.

The focus is on vehicle electrical systems and building networks. The influence of the operating voltage is dealt with in particular. The book is primarily aimed at students of automation and electrical engineering, but is also suitable for practitioners who are entrusted with the development of DC networks.

The book enables you to plan a low-voltage DC network from scratch. You will learn about all the necessary equipment and how it works - from the voltage source to the accumulators and voltage transformers to the switches and plug connections. In addition, the dimensioning of the cable network is covered. The calculation of line currents, voltage drops, line losses and short-circuit currents is explained. The calculation methods presented will help you to dimension the equipment appropriately. Detailed example calculations for typical cable arrangements round off the content.

An introduction to line and equipment protection, personal protection and fire protection will help you to select suitable protective devices. Particular attention is paid to the conditions under which overcurrent protective devices can be used for personal protection. The procedures for detecting arcing faults in the event of conductor breakage, which can prevent a fire from being triggered, are also considered.



Nanoelectronics

Components of the future
2nd revised and updated edition
ISBN: 978-3-446-47899-2
Pages: **330**
Publication date : **February 2024**

Mastering new technological challenges with nanoelectronics

Due to the constantly increasing integration density of microelectronic circuits, structure sizes of just a few nanometers are being produced today. This is associated with effects that could have been neglected a few technology generations ago. These effects limit the further miniaturization of the classic transistor as the most important switching element. On the other hand, these quantum mechanical effects can also be used to realize transistor structures based on novel principles.

The textbook first introduces the basics of semiconductor physics and deals in particular with the effects that are used in nanostructure components. Classic components such as diodes, bipolar transistors and single-gate MOSFETs are presented. Subsequently, the focus is on special nanostructure MOSFETs and their electrical properties are explained in connection with the previously developed basics.

The book offers calculation examples for all chapters to deepen understanding and a questionnaire to test understanding. Furthermore, reference is made to an online simulation platform (nanohub.org, free of charge after registration), which has established itself as a repository of various simulators at different levels of abstraction.

Applied image processing and image analysis

Methods, concepts and algorithms in optotechnology, optical metrology and industrial quality control

2nd revised and expanded edition
ISBN: 978-3-446-47910-4
Pages: **330**
Publication date : **April 2024**

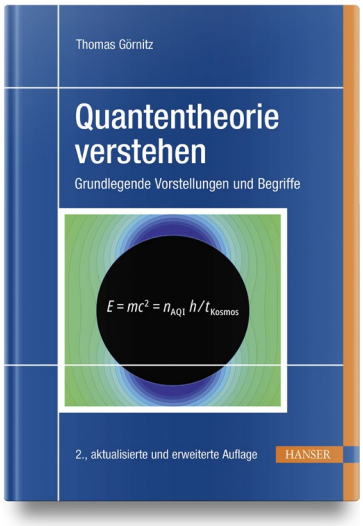
The most important basics of applied image processing

Image processing and image analysis are important components in many industrial processes, for example in quality assurance, material testing, the investigation of geological and mineralogical structures, in the development of modern CCD or CMOS cameras and generally in the control and automation of processes.

This textbook covers the basic methods, concepts and algorithms. With the help of mathematical principles, image transformations are evaluated with regard to their effect and the results of image analysis are carefully compared with regard to the expected accuracy. Particular attention is paid to the algorithmic implementation and the estimation of the expected computing speed. Numerous easy-to-follow examples and exercises with solutions emphasize the textbook character. The presentation of some algorithms in the form of source code enables readers to implement their own methods and program independently.

The book is aimed at students of electrical engineering, in particular automation technology and mechatronics, computer science, materials technology and optotechnology. It is also aimed at developers of image processing systems and engineers who deal with the use of these systems in an industrial environment.

For the second edition, the textbook has been redesigned in four colors and the topic of image analysis has been expanded.



Understanding quantum theory

Fundamental ideas and terms
2nd updated and expanded edition
ISBN: 978-3-446-48026-1
Pages: **650**
Publication date: **July 2024**

Overarching relationships of quantum theory presented in a simple and understandable way

Quantum theory is the branch of physics that has changed the world the most in the last hundred years since its creation. Computers and space travel, the internet, solar cells, modern brain research and flat screens - none of this would be conceivable without quantum theory. The next revolutionary step is the quantum computer, for which the race has already begun.

And yet quantum physics is still the branch of physics that is surrounded by many unsolved problems and questions of a very fundamental nature. In the eyes of many scientists, it is considered incomprehensible, not least due to misunderstandings and unclear terminology. Nevertheless, a lot has happened in a hundred years. There are more recent experimental results that confirm the theory and even lift it out of the microworld. There are newer approaches that build bridges to classical physics.

For the first time, the author of this book offers an introduction to quantum theory that focuses on understanding and the big picture rather than arithmetic. The author covers a wide range of topics and connects the quantum world with the cosmos.

Here are some of the book's topics:

- Real and possible structures as the driving force of nature
- Quanta and black holes
- The dead end of the smallest particles
- Basic principles of classical physics versus quantum physics
- The concept of time in physics
- Counting facts and possibilities
- Cosmology and the equivalence of mass, energy and quantum information
- Solutions to problems of contemporary cosmology
- the fundamental interactions

Continuum physics

The classical field theories in a modern presentation

ISBN: 978-3-446-47342-3
Pages: **398**
Publication date: **February 2024**

Field theories as the key to a holistic understanding of mechanics, thermodynamics and electrodynamics

The classical textbooks of theoretical physics on this subject were written at a time when the rational approach of modern continuum mechanics and material theory had not yet been incorporated. Nevertheless, valuable insights can be gained from these books that are only partially accessible from the modern literature.

This book therefore aims, on the one hand, to introduce students to the current state of research and, on the other hand, to enable them to include the classical works in their studies.

The focus is on the following topics:

- Introduction to modern vector and tensor calculus with bridging to classical index calculus. The emphasis is on understanding mathematics as a tool of physics and presenting it in a handy form that can be used immediately.
- Basic concepts of continuum theory, namely balances and principles of material theory, which is the bridge to rational thermodynamics via the entropy principle
- Requirements of the mechanics and thermodynamics of solid, liquid and gaseous bodies
- Basic principles of electrodynamics, Maxwell's equations

The work contains numerous and extensive application examples from all the above-mentioned areas of theoretical physics.

Graphs and network theory

Fundamentals - Methods – Applications

2nd updated and expanded edition

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Clear and comprehensible presentation of methods and models

Graphs and networks are of great importance in computer science and economics. These mathematical tools can be used to structure and solve a wide range of practical problems in logistics, production engineering and process management, as well as matching problems such as finding a partner.This compact textbook combines the mathematically important aspects of graph theory with the modeling of practical problems against an economic background. Emphasis is placed on presenting the interfaces and connections between the two sides in an understandable way.

The book has two objectives in line with the two main topics:

- It conveys the basics of graph theory and
- selected practical topics are used to illustrate how economically relevant problems can be solved using this type of mathematics.

For the new edition, the content has been updated and new examples have been added.

From the contents:
Fundamentals of graph theory - The shortest path problem in unweighted and weighted graphs - The minimum spanning tree problem - Matching problems - The Chinese letter carrier problem - The traveling salesman problem - Coloring problems - Network theory - Properties of networks - Software-based analysis and modeling of large networks