

## Bookmark File PDF Exergy Analysis Of Combined Cycle Cogeneration Systems A modernh.com

Steam Power Engineering Fundamentals of Engineering Thermodynamics Renewable Energy and its Innovative Technologies Recycling and Reuse of Materials and Their Products Gas Turbine Combined Cycle Power Plants Introduction to Mechanical Engineering MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT - Volume IV Exergy EXERGY ANALYSIS OF COMBINED CYCLE COGENERATION SYSTEMS. Exergy, Energy System Analysis and Optimization - Volume II Progress in Sustainable Energy Technologies Vol II Thermal Cycles of Heat Recovery Power Plants Thermodynamic Optimization of Complex Energy Systems Handbook of Research on Advances and Applications in Refrigeration Systems and Technologies Applied Thermodynamics Cogeneration and Polygeneration Systems Optimum Choice of Energy System Configuration and Storages for a Proper Match between Energy Conversion and Demands Flexible Kalina Cycle Systems Optimization of Energy Systems Scientific and Technical Aerospace Reports Organic Rankine Cycle (ORC) Power Systems ECOS 2012 The 25th International Conference on Efficiency, Cost, Optimization and Simulation of Energy Conversion Systems and Processes (Perugia, June 26th-June 29th, 2012) Exergy Optimum Design of Renewable Energy Systems: Microgrid and Nature Grid Methods Natural Gas Efficiency of Biomass Energy Exergy Analysis for Energy Conversion Systems The Role of Exergy in Energy and the Environment Emerging Technologies for Sustainable Desalination Handbook Progress in Sustainable Energy Technologies: Generating Renewable Energy Proceedings of the 3rd International Gas Processing Symposium CRC Handbook of Thermal Engineering, Second Edition Applications of Machine Learning Fossil Energy Update Design and Performance Optimization of Renewable Energy Systems Gas Turbines Progress in Exergy, Energy, and the Environment Sustainable Energy Systems and Applications Thermoökonomische Bewertung des Organic Rankine Cycles bei der Stromerzeugung aus industrieller Abwärme Cogeneration and District Energy Systems

Emerging Technologies for Sustainable Desalination Handbook provides professionals and researchers with the latest treatment activities in the advancement of desalination technology. The book enables municipalities and private companies to custom-design sustainable desalination plants that will minimize discharge, energy costs and environmental footprint. Individual case studies are included to illustrate the benefits and drawback of each technique. Sections discuss a multitude of recently developed, advanced processes, along with notable advances made in existing technologies. These processes include adsorption, forward osmosis, humidification and dehumidification, membrane distillation, pervaporation and spray type thermal processes. In addition, theoretical membrane materials, such as nanocomposite and carbon nanotube membranes are also explored. Other chapters cover the desalination of shale gas, produced water, forward osmosis for agriculture, desalination for crop irrigation, and seawater for sustainable agriculture. International in its coverage, the chapters of this handbook are contributed by leading authors and researchers in all relevant fields. Expertly explains recent advances in sustainable desalination technology, including nanocomposite membranes, carbon nanotube membranes, forward reverse osmosis and desalination by pervaporation Provides state-of-the-art techniques for minimizing system discharge, energy cost and environmental footprint Includes individual case studies to illustrate the benefits and drawbacks of each technique Discusses techniques for the custom-design of sustainable desalination plants for municipalities, private companies and industrial operations

Cogeneration and Polygeneration Systems explores the suite of state-of-the-art modeling, design, analysis and optimization procedures for creating and retooling optimally efficient combined heat and power (CHP) and polygeneration energy systems. The book adopts exergetic and thermoeconomic analysis and related modeling and simulation tools to inform performance and systems design in modern cogeneration plants. Chapters provide a methodical approach to the design, operation and troubleshooting of cogeneration systems when they are integrated with industrial processes. Cogeneration targets, environmental impacts, total site integration, and availability and reliability issues are addressed in-depth. Explores exergetic and exergoeconomic analysis for optimization purposes of CHP systems Addresses availability and reliability issues within cogeneration systems Reviews modern polygeneration systems based on renewable energy resources and fuel cells

Design and Performance Optimization of Renewable Energy Systems provides an integrated discussion of issues relating to renewable energy performance design and optimization using advanced thermodynamic analysis with modern methods to configure major renewable energy plant configurations (solar, geothermal, wind, hydro, PV). Vectors of performance enhancement reviewed include thermodynamics, heat transfer, exergoeconomics and neural network techniques. Source technologies studied range across geothermal power plants, hydroelectric power, solar power towers, linear concentrating PV, parabolic trough solar collectors, grid-tied hybrid solar PV/Fuel cell for freshwater production, and wind energy systems. Finally, nanofluids in renewable energy systems are reviewed and discussed from the heat transfer enhancement perspective. Reviews the fundamentals of thermodynamics and heat transfer concepts to help engineers overcome design challenges for performance maximization Explores advanced design and operating principles for solar, geothermal and wind energy systems with diagrams and examples Combines detailed mathematical modeling with relevant computational analyses, focusing on novel techniques such as artificial neural network analyses Demonstrates how to maximize overall system performance by achieving synergies in equipment and component efficiency

Natural gas has traditionally been used as a feedstock for the chemical industry, and as a fuel for process and space heating. Recent advances in exploration, drilling techniques and hydraulic fracturing have made it possible for natural gas to become available in abundance (as of 2012). As natural gas displaces traditional petroleum use in various sectors, a certain amount of disruption is likely. In such a changing landscape, this book tries to chronicle the state-of-the-art in various aspects of natural gas: exploration, drilling, gas processing, storage, distribution, end use and finally the impact on financial markets. Review articles as well as research papers contributed by leading authorities around the world comprise individual chapters of this book. Modeling approaches, as well as, recent advances in specific natural gas technologies are covered in detail.

Viele Industriezweige sind sehr energieintensiv; für ihre Prozesse benötigen sie nicht nur viel Energie, sondern setzen auch einen großen Teil davon wieder als Wärme frei. Diese kann im günstigen Fall direkt im Prozess oder anderweitig im Betrieb weiterverwendet werden. Meist werden aber große Mengen als Abwärme ungenutzt an die Umgebung abgegeben. Es liegt nahe, solche Abwärme in elektrische Energie umzuwandeln, der als Strom leichter zu transportieren ist als Wärme. Als eine hierfür besonders aussichtsreiche Technologie hat sich der Organic Rankine Cycle (ORC) erwiesen. Im Unterschied zum konventionellen Dampfkraftprozess wird hierbei als Arbeitsmedium nicht Wasser sondern ein organisches Fluid eingesetzt. Hierzu sind die Prozessführung und einige Anlagenkomponenten an das jeweilige Arbeitsmittel anzupassen. Jede nichtoptimale Auslegung verschlechtert die Wirtschaftlichkeit und engt den Markt der auch ökonomisch sinnvollen Anwendungen ein. In diesem Band wird eine systematische thermoökonomische Beschreibung des ORC-Prozesses vorgestellt, wobei besonders der Anwendungsbereich der industriellen Abwärme untersucht wird.

An essential resource for optimizing energy systems to enhance design capability, performance and sustainability Optimization of Energy Systems comprehensively describes the thermodynamic modelling, analysis and optimization of numerous types of energy systems in various applications. It provides a new understanding of the system and the process of defining proper objective functions for determination of the most suitable design parameters for achieving enhanced efficiency, cost effectiveness and sustainability. Beginning with a general summary of the thermodynamics, optimization techniques and optimization methods for thermal components, the book goes on to describe how to determine the most appropriate design parameters for more complex energy systems using various optimization methods. The results of each chapter provide potential tools for design, analysis, performance improvement, and greenhouse gas emissions reduction. Key features: Comprehensive coverage of the modelling, analysis and optimization of many energy systems for a variety of applications. Examples, practical applications and case studies to put

theory into practice. Study problems at the end of each chapter that foster critical thinking and skill development. Written in an easy-to-follow style, starting with simple systems and moving to advanced energy systems and their complexities. A unique resource for understanding cutting-edge research in the thermodynamic analysis and optimization of a wide range of energy systems, *Optimization of Energy Systems* is suitable for graduate and senior undergraduate students, researchers, engineers, practitioners, and scientists in the area of energy systems.

The concept of sustainable development was first introduced by the Brundtland Commission almost 20 years ago and has received increased attention during the past decade. It is now an essential part of any energy activities. This is a research-based textbook which can be used by senior undergraduate students, graduate students, engineers, practitioners, scientists, researchers in the area of sustainable energy systems and aimed to address some key pillars: better efficiency, better cost effectiveness, better use of energy resources, better environment, better energy security, and better sustainable development. It also includes some cutting-edge topics, such as hydrogen and fuel cells, renewable, clean combustion technologies, CO<sub>2</sub> abatement technologies, and some potential tools (exergy, constructal theory, etc.) for design, analysis and performance improvement.

Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Natural gas continues to be the fuel of choice for power generation and feedstock for a range of petrochemical industries. This trend is driven by environmental, economic and supply considerations with a balance clearly tilting in favor of natural gas as both fuel and feedstock. Despite the recent global economic uncertainty, the oil and gas industry is expected to continue its growth globally, especially in emerging economies. The expansion in LNG capacity beyond 2011 and 2012 coupled with recently launched and on-stream GTL plants poses real technological and environmental challenges. These important developments coupled with a global concern on green house gas emissions provide a fresh impetus to engage in new and more focused research activities aimed at mitigating or resolving the challenges facing the industry. Academic researchers and plant engineers in the gas processing industry will benefit from the state of the art papers published in this collection that cover natural gas utilization, sustainability and excellence in gas processing. Provides state-of-the-art contributions in the area of gas processing Covers solutions to technical and environmental problems Input from academia and industry

This leading text in the field maintains its engaging, readable style while presenting a broader range of applications that motivate engineers to learn the core thermodynamics concepts. Two new coauthors help update the material and integrate engaging, new problems. Throughout the chapters, they focus on the relevance of thermodynamics to modern engineering problems. Many relevant engineering based situations are also presented to help engineers model and solve these problems.

This book is devoted to the analysis and applications of energy, exergy, and environmental issues in all sectors of the economy, including industrial processes, transportation, buildings, and services. Energy sources and technologies considered are hydrocarbons, wind and solar energy, fuel cells, as well as thermal and electrical storage. This book provides theoretical insights, along with state-of-the-art case studies and examples and will appeal to the academic community, but also to energy and environmental professionals and decision makers.

The CRC Handbook of Thermal Engineering, Second Edition, is a fully updated version of this respected reference work, with chapters written by leading experts. Its first part covers basic concepts, equations and principles of thermodynamics, heat transfer, and fluid dynamics. Following that is detailed coverage of major application areas, such as bioengineering, energy-efficient building systems, traditional and renewable energy sources, food processing, and aerospace heat transfer topics. The latest numerical and computational tools, microscale and nanoscale engineering, and new complex-structured materials are also presented. Designed for easy reference, this new edition is a must-have volume for engineers and researchers around the globe.

This volume provides a good understanding of the binary fluid system, highlighting new dimensions of the existing Kalina cycle system, a thermodynamic process for converting thermal energy into usable mechanical power. The book illustrates that providing new flexibility leads to new research outcomes and possible new projects in this field. The information provided in the book simplifies the application of the Kalina cycle system with an easy-to-understand and thorough explanation of properties development, processes solutions, sub-system work, and total system work. There are currently no books available in the area of binary fluid system in the field of KCS with added fallibility in the operation and process design. Currently decentralized power systems are gaining more attention due to shortages in power, and cooling demands are competing with other electrical loads. This book fills a valuable information gap, providing insight into a new dimension for designers, practicing engineers, and academicians in this area.

In this thesis, several configurations of combined cycle cogeneration systems proposed by the author and an existing system, the Bilkent Combined Cycle Cogeneration Plant, are investigated by energy, exergy and thermoeconomic analyses. In each of these configurations, varying steam demand is considered rather than fixed steam demand. Basic thermodynamic properties of the systems are determined by energy analysis utilizing main operation conditions. Exergy destructions within the system and exergy losses to environment are investigated to determine thermodynamic inefficiencies in the system and to assist in guiding future improvements in the plant. Among the different approaches for thermoeconomic analysis in literature, SPECO method is applied. Since the systems have more than one product (process steam and electrical power), systems are divided into several subsystems and cost balances are applied together with the auxiliary equations. Hence, cost of each product is calculated. Comparison of the configurations in terms of performance assessment parameters and costs per unit of exergy are also given in this thesis.

A comprehensive assessment of the methodologies of thermodynamic optimization, exergy analysis and thermoeconomics, and their application to the design of efficient and environmentally sound energy systems. The chapters are organized in a sequence that begins with pure thermodynamics and progresses towards the blending of thermodynamics with other disciplines, such as heat transfer and cost accounting. Three methods of analysis stand out: entropy generation minimization, exergy (or availability) analysis, and thermoeconomics. The book reviews current directions in a field that is both extremely important and intellectually alive. Additionally, new directions for research on thermodynamics and optimization are revealed.

The book features innovative scientific research by scientists, academicians and students, presented at the International Conference on Energy, Materials and Information Technology, 2017 at Amity University Jharkhand, India. Covering all the promising renewable energies and their related technologies, such as wind, solar and biomass energy, it compiles current important scientific research in this field and addresses how it can be applied in an interdisciplinary manner. The selected conference papers provide important data and parameters for utilizing the main potential renewable energies, and allowing an economic and environmental assessment. The book is a valuable resource for all those who are interested in the physical and technical principles of promising ways to utilize various renewable energies.

Deals with the availability method and its application to power plant system design and energy conversion. The first part of the book describes the development and the formulation of the availability method. The second part presents its applications to energy conversion processes. Examples for each energy conversion system are introduced and there are practice problems throughout the text.

Mechanical Engineering, Energy Systems and Sustainable Development theme is a component of Encyclopedia of Physical Sciences, Engineering and Technology

Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Mechanical Engineering, Energy Systems and Sustainable Development with contributions from distinguished experts in the field discusses mechanical engineering - the generation and application of heat and mechanical power and the design, production, and use of machines and tools. These five volumes are aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers, NGOs and GOs.

This book covers the design, analysis, and optimization of the cleanest, most efficient fossil fuel-fired electric power generation technology at present and in the foreseeable future. The book contains a wealth of first principles-based calculation methods comprising key formulae, charts, rules of thumb, and other tools developed by the author over the course of 25+ years spent in the power generation industry. It is focused exclusively on actual power plant systems and actual field and/or rating data providing a comprehensive picture of the gas turbine combined cycle technology from performance and cost perspectives. Material presented in this book is applicable for research and development studies in academia and government/industry laboratories, as well as practical, day-to-day problems encountered in the industry (including OEMs, consulting engineers and plant operators).

This book deals with exergy and its applications to various energy systems and applications as a potential tool for design, analysis and optimization, and its role in minimizing and/or eliminating environmental impacts and providing sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered as outlined in the contents. Offers comprehensive coverage of exergy and its applications, along with the most up-to-date information in the area with recent developments Connects exergy with three essential areas in terms of energy, environment and sustainable development Provides a number of illustrative examples, practical applications, and case studies Written in an easy-to-follow style, starting from the basics to advanced systems

In recent years, the sustainability and safety of perishable foods has become a major consumer concern, and refrigeration systems play an important role in the processing, distribution, and storage of such foods. To improve the efficiency of food preservation technologies, it is necessary to explore new technological and scientific advances both in materials and processes. The Handbook of Research on Advances and Applications in Refrigeration Systems and Technologies gathers state-of-the-art research related to thermal performance and energy-efficiency. Covering a diverse array of subjects—from the challenges of surface-area frost-formation on evaporators to the carbon footprint of refrigerant chemicals—this publication provides a broad insight into the optimization of cold-supply chains and serves as an essential reference text for undergraduate students, practicing engineers, researchers, educators, and policymakers.

Covers the latest advances in the design and operation of large and small steam power plants.

Thermal Cycles of Heat Recovery Power Plants presents information about thermal power plant cycles suitable for waste heat recovery (WHR) in modern power plants. The author covers five thermal power cycles: organic Rankine cycle (ORC), organic flash cycle (OFC), Kalina cycle (KC), steam Rankine cycle (SRC) and steam flash cycle (SFC) with the working fluids of R123, R124, R134a, R245fa, R717 and R407C. The handbook helps the reader to understand the latest power plant technologies suitable for utilizing the waste heat generated by thermal industrial processes. Key Features: - Comprehensive modeling, simulation, analysis and optimization of 5 power cycle types with different working fluids - Clear information about the processes and solutions of thermal power cycles to augment the power generation with improved energy conversion. - Simple, reader friendly presentation - bibliographic references after each chapter for further reading This handbook is suitable for engineering students in degree courses and professionals in training programs who require resources on advanced thermal power plant operation and optimal waste heat recovery processes, respectively. It is also a handy reference for energy conversion efficiency in heat recovery power plants. The book is also of interest to any researchers interested in industrial applications of thermodynamic processes.

Details energy and exergy efficiencies of all major aspects of bioenergy systems Covers all major bioenergy processes starting from photosynthesis and cultivation of biomass feedstocks and ending with final bioenergy products, like power, biofuels, and chemicals Each chapter includes historical developments, chemistry, major technologies, applications as well as energy, environmental and economic aspects in order to serve as an introduction to biomass and bioenergy A separate chapter introduces a beginner in easy accessible way to exergy analysis and the similarities and differences between energy and exergy efficiencies are underlined Includes case studies and illustrative examples of 1st, 2nd, and 3rd generation biofuels production, power and heat generation (thermal plants, fuel cells, boilers), and biorefineries Traditional fossil fuels-based technologies are also described in order to compare with the corresponding bioenergy systems

Organic Rankine Cycle (ORC) Power Systems: Technologies and Applications provides a systematic and detailed description of organic Rankine cycle technologies and the way they are increasingly of interest for cost-effective sustainable energy generation. Popular applications include cogeneration from biomass and electricity generation from geothermal reservoirs and concentrating solar power installations, as well as waste heat recovery from gas turbines, internal combustion engines and medium- and low-temperature industrial processes. With hundreds of ORC power systems already in operation and the market growing at a fast pace, this is an active and engaging area of scientific research and technical development. The book is structured in three main parts: (i) Introduction to ORC Power Systems, Design and Optimization, (ii) ORC Plant Components, and (iii) Fields of Application. Provides a thorough introduction to ORC power systems Contains detailed chapters on ORC plant components Includes a section focusing on ORC design and optimization Reviews key applications of ORC technologies, including cogeneration from biomass, electricity generation from geothermal reservoirs and concentrating solar power installations, waste heat recovery from gas turbines, internal combustion engines and medium- and low-temperature industrial processes Various chapters are authored by well-known specialists from Academia and ORC manufacturers

This multi-disciplinary volume presents information on the state-of-the-art in the sustainable development technologies and tactics. Its unique amalgamation of the latest technical information, research findings and examples of successfully applied new developments in the area of sustainable development will be of keen interest to engineers, students, practitioners, scientists and researchers concerned with sustainability. Problem statements, projections, new concepts, models, experiments, measurements and simulations from not only engineering and science, but disciplines as diverse as ecology, education, economics and information technology are included, in order to create a truly holistic vision of the sustainable development field. The contributions feature coverage of topics including green buildings, exergy analysis, clean carbon technologies, waste management, energy conservation, environmental remediation, energy security and sustainable development policy.

Exergy, Energy System Analysis, and Optimization theme is a component of the Encyclopedia of Energy Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. These three volumes are organized into five different topics which represent the main scientific areas of the theme: 1. Exergy and Thermodynamic Analysis; 2. Thermoeconomic Analysis; 3. Modeling, Simulation and Optimization in Energy Systems; 4. Artificial Intelligence and Expert Systems in Energy Systems Analysis; 5. Sustainability Considerations in the Modeling of Energy Systems. Fundamentals and applications of characteristic methods are presented in these volumes. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

This thorough and highly relevant volume examines exergy, energy and the environment in the context of energy systems and applications and as a potential tool for

design, analysis, optimization. It further considers their role in minimizing and/or eliminating environmental impacts and providing for sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered.

The management of global warming is a relevant issue throughout the world and has experts of various fields considering various methods to control Earth's atmospheric temperature. While microgrid technology is emerging as the next generation energy supply system, renewable energy is often unstable and requires the support of conventional energy equipment. Optimum Design of Renewable Energy Systems: Microgrid and Nature Grid Methods investigates the development of highly efficient energy storage equipment and of operation optimization technology of compound energy systems. This book is an essential reference source for technical consultants, urban environment engineers, and energy researchers interested in the development of efficient energy systems and operation optimization technology.

This Special Issue addresses the general problem of a proper match between the demands of energy users and the units for energy conversion and storage, by means of proper design and operation of the overall energy system configuration. The focus is either on systems including single plants or groups of plants, connected or not to one or more energy distribution networks. In both cases, the optimum design and operation involve decisions about thermodynamic processes, about the type, number, design parameters of components/plants, and storage capacities, and about mutual interconnections and the interconnections with the distribution grids. The problem is absolutely general, encompassing design and operation of energy systems for single houses, groups of houses, industries, industrial districts, municipal areas, regions and countries. The presented papers show that similar approaches can be used in different applications, although a general standard has not been achieved yet.

This important book is an overall analysis of different innovative methods and ways of recycling in connection with various types of materials. It aims to provide a basic understanding about polymer recycling and its reuse as well as presents an in-depth look at various recycling methods. It provides a thorough knowledge about the work being done in recycling in different parts of the world and throws light on areas that need to be further explored. Emphasizing eco-friendly methods and recovery of useful materials The book covers a wide variety of innovative recycling methods and research, including • Green methods of recycling • Effective conversion of biomass and municipal wastes to energy-generating systems • A catalyst for the reuse of glycerol byproduct • Methods of adsorption to treat wastewater and make it suitable for irrigation and other purposes • Disposal of sludge • The use of calcined clay to replace both fine and coarse aggregates • Recycling of rubbers • The production of a sorbent material for paper mill sludge • Replacing polypropylene absorbent in oil spill sanitations • The use of natural fibers for various industrial applications • Cashew nut shell liquid as a source of surface active reagents • Integrated power and cooling systems based on biomass • Recycling water from household laundering • much more

The advantages of district energy systems over conventional heating and cooling systems include improved efficiency, reliability and safety, reduced environmental impact, and for many situations they are more economical. They can be particularly beneficial when integrated with combined heat and power (CHP) plants, i.e. with cogeneration plants for electricity and heat. One of the main impediments to increased use of cogeneration based district energy systems is a lack of understanding of the behaviour of integrated forms of such systems. This important book covers district energy and CHP technologies, as well as systems that combine them. It focuses on modelling, analysis and optimization, of cogeneration-based district energy systems. The modelling includes characterizing the general configurations and components of cogeneration and direct energy systems, and the development, verification and validation, of models for such systems. The analysis focuses on the application of thermodynamic analysis, and economic assessment techniques, to these systems. The optimization covers the identification of objective functions and constraints, and the development and application of optimization tools and computer code. This comprehensive overview of existing systems provides an essential resource for engineers and researchers in a broad area including mechanical engineering, chemical engineering, energy engineering, environmental engineering, process engineering and industrial engineering. It will also be of value to advanced undergraduate or graduate students in these disciplines.

Discover a straightforward and holistic look at energy conversion and conservation processes using the exergy concept with this thorough text. Explains the fundamental energy conversion processes in numerous diverse systems, ranging from jet engines and nuclear reactors to human bodies. Provides examples for applications to practical energy conversion processes and systems that use our naturally occurring energy resources, such as fossil fuels, solar energy, wind, geothermal, and nuclear fuels. With more than one-hundred diverse cases and solved examples, readers will be able to perform optimizations for a cleaner environment, a sustainable energy future, and affordable energy generation. An essential tool for practicing scientists and engineers who work or do research in the area of energy and exergy, as well as graduate students and faculty in chemical engineering, mechanical engineering and physics.

This book covers applications of machine learning in artificial intelligence. The specific topics covered include human language, heterogeneous and streaming data, unmanned systems, neural information processing, marketing and the social sciences, bioinformatics and robotics, etc. It also provides a broad range of techniques that can be successfully applied and adopted in different areas. Accordingly, the book offers an interesting and insightful read for scholars in the areas of computer vision, speech recognition, healthcare, business, marketing, and bioinformatics.

This multi-disciplinary volume presents information on the state-of-the-art in sustainable energy technologies key to tackling the world's energy challenges and achieving environmentally benign solutions. Its unique amalgamation of the latest technical information, research findings and examples of successfully applied new developments in the area of sustainable energy will be of keen interest to engineers, students, practitioners, scientists and researchers working with sustainable energy technologies. Problem statements, projections, new concepts, models, experiments, measurements and simulations from not only engineering and science, but disciplines as diverse as ecology, education, economics and information technology are included, in order to create a truly holistic vision of the sustainable energy field. The contributions feature coverage of topics including solar and wind energy, biomass and biofuels, waste-to-energy, renewable fuels, geothermal and hydrogen power, efficiency gains in fossil fuels and energy storage technologies including batteries and fuel cells.

This textbook fosters information exchange and discussion on all aspects of introductory matters of modern mechanical engineering from a number of perspectives including: mechanical engineering as a profession, materials and manufacturing processes, machining and machine tools, tribology and surface engineering, solid mechanics, applied and computational mechanics, mechanical design, mechatronics and robotics, fluid mechanics and heat transfer, renewable energies, biomechanics, nanoengineering and nanomechanics. At the end of each chapter, a list of 10 questions (and answers) is provided.

This book is intended to provide valuable information for the analysis and design of various gas turbine engines for different applications. The target audience for this book is design, maintenance, materials, aerospace and mechanical engineers. The design and maintenance engineers in the gas turbine and aircraft industry will benefit immensely from the integration and system discussions in the book. The chapters are of high relevance and interest to manufacturers, researchers and academicians as well.

Bridging the gap between concepts derived from Second Law of Thermodynamics and their application to Engineering practice, the property exergy and the exergy balance can be a tool for analyzing and improving the performance of energy conversion processes. With the exergy analysis it is possible to evaluate the performance of energy conversion processes not only on a thermodynamics basis but also by including production costs and environmental aspects and impacts of the studied processes. This comprehensive approach of the use of energy has, as one of the most important feature, the identification of sustainable ways of energy resources utilization. Based on the fundamentals of the exergy concept, its calculation, graphical representations and exergy balances evaluation, Exergy: Production Cost And

Renewability describes the application of detailed exergy and thermoeconomic analysis to power plants and polygeneration systems, petroleum production and refining plants (including hydrogen production), chemical plants, biofuel production routes, combined production of ethanol and electricity, aircraft systems design, environmental impact mitigation processes and human body behavior. The presented case studies aim at providing students, researchers and engineers with guidelines to the utilization of the exergy and thermoeconomic analysis to model, simulate and optimize real processes and industrial plants.

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