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HISTORY AND PHILOSOPHY OF SCIENCE AND TECHNOLOGY -Volume III EOLSS Publications Undoubtedly the applications of polymers are rapidly evolving. Technology is continually changing and quickly advancing as polymers are needed to solve a variety of day-to-day challenges leading to improvements in quality of life. The Encyclopedia of Polymer Applications presents state-of-the-art research and development on the applications of polymers. This groundbreaking work provides important overviews to help stimulate further advancements in all areas of polymers. This comprehensive multi-volume reference includes articles contributed from a diverse and global team of renowned researchers. It offers a broad-based perspective on a multitude of topics in a variety of applications, as well as detailed research information, figures, tables, illustrations, and references. The encyclopedia provides introductions, classifications, properties, selection, types, technologies, shelf-life, recycling, testing and applications for each of the entries where applicable. It features critical content for both novices and experts including, engineers, scientists (polymer scientists, materials scientists, biomedical engineers, macromolecular chemists), researchers, and students, as well as interested readers in academia, industry, and research institutions.

Continuum Mechanics - Volume III EOLSS Publications This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, 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.

Continuum Mechanics - Volume II

EOLSS Publications 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.

`Civil Engineering - Volume II`
`EOLSS Publications`
`This Encyclopedia of Control`
`Systems, Robotics, and`
`Automation is a component of`
`the global Encyclopedia of Life`
`Support Systems EOLSS, which is`
`an integrated compendium of`
`twenty one Encyclopedias. This`
`22-volume set contains 240`
`chapters, each of size`
`5000-30000 words, with`
`perspectives, applications and`
`extensive illustrations. It is`
`the only publication of its`
`kind carrying state-of-the-art`

`knowledge in the fields of`
`Control Systems, Robotics, and`
`Automation and is aimed, by`
`virtue of the several`
`applications, 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.`

EOLSS Publications Computational Models is a component of Encyclopedia of Mathematical Sciences in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Modern Computational Mathematics arises in a wide variety of fields, including business, economics, engineering, finance, medicine and science. The Theme on Computational Models provides the essential aspects of Computational Mathematics emphasizing Basic Methods for Solving Equations; Numerical Analysis and Methods for Ordinary Differential Equations; Numerical Methods and Algorithms; Computational Methods and Algorithms; Numerical Models and Simulation. These two volumes are aimed at those seeking in-depth of advanced knowledge: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs

CONTROL SYSTEMS, ROBOTICS AND AUTOMATION – Volume V EOLSS Publications Hydraulic Structure, Equipment and Water Data Acquisition Systems is a component of Encyclopedia of Water Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Hydraulic structures occupied a vital role in the development of civilization from the earliest recorded history up to the present, and undoubtedly will do so in the future. Humanity in ancient times settled mostly near perennial rivers, nomadic people frequented oases and springs, and to augment these natural ephemeral supplies, established societies built

primitive dams and dug wells. This 4-volume set contains several chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It carries state-of-the-art knowledge in the fields of Hydraulic Structure, Equipment and Water Data Acquisition Systems. In these volumes the historical origins, modern developments, and future perspectives in the field of water supply engineering are discussed. Various types of hydraulic structures, their associated equipment, and the various systems for collecting data are described. These four 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.

Continuum Mechanics and Thermodynamics EOLSS Publications

Thermal to Mechanical Energy Conversion: Engines and Requirements is a component of Encyclopedia of Energy 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 Thermal to Mechanical Energy Conversion: Engines and Requirements with contributions from distinguished experts in the field discusses energy. 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.

MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT -Volume V EOLSS Publications

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.

Structural Engineering and Geomechanics - Volume 1 EOLSS Publications

Fundamentals of Physics 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 Encyclopedias. The Theme on Fundamentals of Physics provides an overview of the modern areas in physics, most of which had been crystallized in the 20th century, is given. The Theme on

Fundamentals of Physics deals, in three volumes and cover several topics, with a myriad of issues of great relevance to our world such as: Historical Review of Elementary Concepts in Physics; Laws of Physical Systems; Particles and Fields; Quantum Systems; Order and Disorder in Nature; Topical Review: Nuclear Processes, which are then expanded into multiple subtopics, each as a chapter. 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, NGOs and GOs.

Mathematical Models in Economics - Volume I EOLSS Publications

Mathematical Models in Economics is a component of Encyclopedia of Mathematical Sciences in which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. This theme is organized into several different topics and introduces the applications of mathematics to economics. Mathematical economics has experienced rapid growth, generating many new academic fields associated with the development of mathematical theory and computer. Mathematics is the backbone of modern economics. It plays a basic role in creating ideas, constructing new theories, and empirically testing ideas and theories. Mathematics is now an integral part of economics. The main advances in modern economics are characterized by applying mathematics to various economic problems. Many of today's profound insights into economic problems could hardly be obtained without the help of mathematics. The concepts of equilibrium versus non-equilibrium, stability versus instability, and steady states versus chaos in the contemporary literature are difficult to explain without mathematics. The theme discusses on modern versions of some classical economic theories, taking account of balancing between significance of economic issues and mathematical techniques. These two 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.

Electrical Engineering - Volume II EOLSS Publications

Systems Engineering and Management for Sustainable Development is a component of Encyclopedia of Technology, Information, and Systems Management Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. This theme discusses: basic principles of systems engineering and management for sustainable development, including: cost effectiveness assessment; decision assessment, tradeoffs, conflict resolution and negotiation; research and development policy; industrial ecology; and risk management strategies for

sustainability. The emphasis throughout will be upon the development of appropriate life-cycles for processes that assist in the attainment of sustainable development, and in the use of appropriate policies and systems management approaches to ensure successful application of these processes. The general objectives of these chapters is to illustrate the way in which one specific issue, such as the need to bring about sustainable development, necessarily grows in scope such that it becomes only feasible to consider the engineering and architecting of appropriate systems when the specific issue is imbedded into a wealth of other issues. The discussions provide an illustration of the many attributes and needs associated with the important task of utilizing information and knowledge, enabled through systems engineering and management, to engineer systems involving humans, organizations, and technology, in the support of sustainability. These two 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.

PHYSICAL METHODS, INSTRUMENTS AND MEASUREMENTS – Volume II EOLSS Publications

This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, 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.

Nuclear Energy Materials And Reactors - Volume I EOLSS Publications

Civil Engineering is the 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. Civil Engineering is the oldest of the engineering specialties and has contributed very much to develop our society throughout the long history of human life. The advancement of civil engineering has, therefore, been closely related to that of civilization. In this theme, human activities on the earth from ancient times to the present are briefly reviewed first, and then the history of the process to establish the civil engineering discipline is discussed for better understanding of the important role that civil engineering has played in the growth of a mature society, from both technological and social points of view. Broad diversification of civil engineering

has resulted from the enormous expansion of society during the latter half of the twentieth century. The various branches are briefly described to show the notable characters that civil engineering has formed to maintain the sustainable development of society. The Theme on Civil Engineering with contributions from distinguished experts in the field provides the essential aspects and fundamentals of civil engineering. The two 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.

Encyclopedia of Polymer Applications, 3 Volume Set EOLSS Publications

The Virtual Fields Method: Extracting Constitutive Mechanical Parameters from Full-field Deformation Measurements is the first and only one on the Virtual Fields Method, a recent technique to identify materials mechanical properties from full-field measurements. It contains an extensive theoretical description of the method as well as numerous examples of application to a wide range of materials (composites, metals, welds, biomaterials etc.) and situations(static, vibration, high strain rate etc.). Finally, it contains a detailed training section with examples of progressive difficulty to lead the reader to program the VFM. This is accompanied with a set of commented Matlab programs as well as with a GUI Matlab based software for more general situations.

FUNDAMENTALS OF CHEMISTRY - Volume I EOLSS Publications

Sustainable Built Environment is a component of Encyclopedia of Technology, Information, and Systems Management Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Environmental conservation and technological innovation are two principal forces that drive the building industry toward the future. Technological innovation offers many opportunities to make buildings more dynamic and comfortable, and occupants more comfortable and productive. The necessity of environmental conservation, on the other hand, compels all types of developments and human activities to be environmentally responsive. The content of the Theme on Sustainable Built Environment is organized with state-of-the-art presentations covering several topics: Urban Design ; Emerging Issues in Building Design; Environment, Energy and Health in Housing Design; Culture, Management Strategies, and Policy Issues in the Sustainable Built Environment; Using Technology to Improve the Quality of City Life; Urban and Regional Transportation, which are then expanded into multiple subtopics, each as a chapter. These two 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.

MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT -Volume III EOLSS Publications

Fundamentals of Chemistry theme in two volumes, is a component of Encyclopedia of Chemical 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 is organized into six different topics which represent the main scientific areas : History and Fundamentals of Chemistry; Chemical Experimentation and Instrumentation; Theoretical Approach to Chemistry; Chemical Thermodynamics; Rates of Chemical Reactions; Chemical Synthesis of Substances. These two 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

CONTROL SYSTEMS, ROBOTICS AND AUTOMATION – Volume Cambridge University Press

This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, 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.

COMPUTATIONAL MODELS - Volume II EOLSS Publications

This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, 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.

Sustainable Built Environment - Volume I EOLSS Publications

Treats subjects directly related to nonlinear materials modeling for graduate students and researchers in physics, materials science, chemistry and engineering.

The Virtual Fields Method EOLSS Publications

The main objective of continuum mechanics is to predict the response of a body that is under the action of external and/or internal influences, i.e. to capture and describe different mechanisms associated with the motion of a body that is under the action of loading. A body in continuum mechanics is considered to be matter continuously distributed in space. Hence, no attention is given to the microscopic (atomic) structure of real materials although non-classical generalized theories of continuum mechanics are able to deal with the mesoscopic structure of matter (i.e. defects, cracks, dispersive lengths, ...). Matter occupies space in time and the response of a body in continuum mechanics is restricted to the Newtonian space-time of classical mechanics in this volume. Einstein's theory of relativity is not considered. In the classical sense, loading is considered as any action that changes the motion of the body. This includes, for instance, a change in temperature or a force applied. By introducing the concept of configurational forces a load may also be considered as a force that drives a change in the material space, for example the opening of a crack. Continuum mechanics refers to field descriptions of phenomena that are usually modeled by partial differential equations and, from a mathematical point of view, require non-standard knowledge of non-simple technicalities. One purpose in this volume has been to present the different subjects in a self-contained way for a general audience. The organization of the volume is as follows. Mathematically, to predict the response of a body it is necessary to formulate boundary value problems governed by balance laws. The theme of the volume, that is an overview of the subject, has been written with this idea in mind for beginners in the topic. Chapter 1 is an introduction to continuum mechanics based on a one-dimensional framework in which, simultaneously, a more detailed organization of the chapters of this volume is given. A one-dimensional approach to continuum mechanics in some aspects maybe misleading since the analysis is oversimplified. Nevertheless, it allows us to introduce the subject through the early basic steps of the continuum analysis for a general audience. Chapters 3, 4 and 5 are devoted to the mathematical setting of continuum analysis: kinematics, balance laws and thermodynamics, respectively. Chapters 6 and 7 are devoted to constitutive equations.

Chapters 8 and 9 deal with different issues in the context of linear elastostatics and linear elastodynamics and waves, respectively, for solids. Linear Elasticity is a classical and central theory of continuum mechanics. Chapter 10 deals with fluids while chapter 11 analyzes the coupled theory of thermoelasticity. Chapter 12 deals with nonlinear elasticity and its role in the continuum framework. Chapters 13 and 14 are dedicated to different applications of solid and fluid mechanics, respectively. The rest of the chapters involve some advanced topics. Chapter 15 is dedicated to turbulence, one of the main challenges in fluid mechanics. Chapter 16 deals with electro-magneto active materials (a coupled theory). Chapter 17 deals with specific ideas of soft matter and chapter 18 deals with configurational forces. In chapter 19, constitutive equations are introduced in a general (implicit) form. Well-posedness (existence, time of existence, uniqueness, continuity) of the equations of the mechanics of continua is an important topic which involves sophisticated mathematical machinery. Chapter 20 presents different analyses related to these topics. Continuum Mechanics is an interdisciplinary subject that attracts the attention of engineers, mathematicians, physicists, etc., working in many different disciplines from a purely scientific environment to industrial applications including biology, materials science, engineering, and many other subjects.