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Editors

Constructal Theory of Social Dynamics

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Adrian Bejan, Sylvie Lorente



Constructal Theory Of Social Dynamics:

Constructal Theory of Social Dynamics Adrian Bejan, Gilbert W. Merks, 2007-10-26 Constructal Theory of Social Dynamics brings together for the first time social scientists and engineers who present predictive theory of social organization as a conglomerate of mating flows that morph in time to flow more easily The book offers a new way to look at social phenomena as part of natural phenomena and examines a new domain of application of engineering such as thermodynamic optimization thermoeconomics and design as science

Constructal Human Dynamics, Security and Sustainability Adrian Bejan, 2009 Globalization security infrastructure and energy sustainability can be designed based on a scientific principle In this book these objectives are approached based on constructal theory which means to design such projects as global flow architectures that are alive with movement of personnel equipment information education etc Constructal Human Dynamics Security and Sustainability highlights the progress made during the NATO Advanced Research Workshop held in Vila Real Portugal in May 2008 This workshop brought together social scientists with physicists engineers and biologists Together they addressed main topics such as human dynamics viewed as natural phenomena of design generation flow networks for distribution and collection large scale construction projects e g airports waste storage logistics decontamination energy supply routes distributed energy systems water resources management environmental security sustainability and globalization The chapters selected for this book represent the interdisciplinary approach and team atmosphere that emerged in Vila Real

Design with Constructal Theory Adrian Bejan, Sylvie Lorente, 2008-09-09 Design course on the universal principle of configurations in nature and engineering the constructal law Design with Constructal Theory offers a revolutionary new approach based on physics for understanding and predicting the designs that arise in nature and engineering from the tree and the forest to the cooling of electronics urban design decontamination and vascular smart materials This book shows how you can use the method of constructal theory to design human made systems in order to reduce trial and error and increase the system performance First developed in the late 1990s constructal theory holds that flow architecture arises from the natural evolutionary tendency to generate greater flow access in time and in flow configurations that are free to morph It unites flow systems with solid mechanical structures which are viewed as systems for the flow of stresses Constructal theory unites nature with engineering and helps us generate novel designs across the board from high density packages to vascular materials with new functionalities self healing self cooling and from tree shaped heat exchangers to svelte fluid flow and solid structures Design with Constructal Theory starts with basic principles and then shows how these principles are applied to understanding and designing increasingly complex systems Problems and exercises at the end of each chapter give you an opportunity to use constructal theory to solve actual design problems This book is based on a design course developed by the two authors for upper level undergraduates and graduate students at Duke University and other universities all over the world With the authors expert guidance students and professionals in

mechanical civil environmental chemical aerospace and biomedical engineering will understand natural systems and then practice design as science by relying on constructal strategies to pursue and discover novel and effective designs

Constructal Law and the Unifying Principle of Design Luiz A.O. Rocha, Sylvie Lorente, Adrian Bejan, 2012-12-04 Design happens everywhere whether in animate objects e.g. dendritic lung structures bacterial colonies and corals inanimate patterns river basins beach slope and dendritic crystals social dynamics pedestrian traffic flows or engineered systems heat dissipation in electronic circuitry This design in nature often takes on remarkably similar patterns which can be explained under one unifying Constructal Law This book explores the unifying power of the Constructal Law and its applications in all domains of design generation and evolution ranging from biology and geophysics to globalization energy sustainability and security The Constructal Law accounts for the universal tendency of flow systems to morph into evolving configurations that provide greater and easier access over time The Constructal Law resolves the many and contradictory ad hoc statements of optimality end design and destiny in nature such as minimum and maximum entropy production and minimum and maximum flow resistance and also explains the designs that are observed and copied in biomimetics Constructal Law and the Unifying Principle of Design covers the fundamentals of Constructal Theory and Design as well as presenting a variety of state of the art applications Experts from the biological physical and social sciences demonstrate the unification of all design phenomena in nature and apply this knowledge to novel designs in modern engineering such as vascularization for self healing and self cooling materials for aircraft and tree fins and cavities for heat transfer enhancement

Design in Nature Adrian Bejan, J. Peder Zane, 2013-01-08 In this groundbreaking book Adrian Bejan takes the recurring patterns in nature trees tributaries air passages neural networks and lightning bolts and reveals how a single principle of physics the constructal law accounts for the evolution of these and many other designs in our world Everything from biological life to inanimate systems generates shape and structure and evolves in a sequence of ever improving designs in order to facilitate flow River basins cardiovascular systems and bolts of lightning are very efficient flow systems to move a current of water blood or electricity Likewise the more complex architecture of animals evolve to cover greater distance per unit of useful energy or increase their flow across the land Such designs also appear in human organizations like the hierarchical flowcharts or reporting structures in corporations and political bodies All are governed by the same principle known as the constructal law and configure and reconfigure themselves over time to flow more efficiently Written in an easy style that achieves clarity without sacrificing complexity Design in Nature is a paradigm shifting book that will fundamentally transform our understanding of the world around us

Theorizing the Dynamics of Social Processes Harry F. Dahms, Lawrence Hazelrigg, 2010-08-18 Intends to assemble a set of essays that invent develop and or demonstrate strategies for theorizing one or several dynamic processes so as to identify illustrate by example and analyze specific problems as well as connect theorizations of process across different disciplines of inquiry

Single and Two-Phase Flows on Chemical and Biomedical Engineering

Ricardo Dias, Antonio A. Martins, Rui Lima, Teresa M. Mata, 2012-07-30 Single and two phase flows are ubiquitous in most natural process and engineering systems Examples of systems or process include packed bed reactors either single phase or multiphase absorber and adsorber separation columns filter beds plate heat exchangers flow of viscoelastic fluids in polymer systems or the enhanced recovery of oil among others In each case the flow plays a central role in determining the system or process behavior and performance A better understanding of the underlying physical phenomena and the ability to describe the phenomena properly are both crucial to improving design operation and control processes involving the flow of fluids ensuring that they will be more efficient and cost effective Expanding disciplines such as microfluidics and the simulation of complex flow physical systems such as blood flow in physiological networks also rely heavily on accurate predictions of fluid flow Recent advances either in computational and experimental techniques are improving the existing knowledge of single and multiphase flows in engineering and physical systems of interest This ebook is a review on the state of the art and recent advances in critical areas of fluid mechanics and transport phenomena with respect to chemical and biomedical engineering applications

Science Dynamics and Research Production Nikolay K. Vitanov, 2016-08-01 This book deals with methods to evaluate scientific productivity In the book statistical methods deterministic and stochastic models and numerous indexes are discussed that will help the reader to understand the nonlinear science dynamics and to be able to develop or construct systems for appropriate evaluation of research productivity and management of research groups and organizations The dynamics of science structures and systems is complex and the evaluation of research productivity requires a combination of qualitative and quantitative methods and measures The book has three parts The first part is devoted to mathematical models describing the importance of science for economic growth and systems for the evaluation of research organizations of different size The second part contains descriptions and discussions of numerous indexes for the evaluation of the productivity of researchers and groups of researchers of different size up to the comparison of research productivities of research communities of nations Part three contains discussions of non Gaussian laws connected to scientific productivity and presents various deterministic and stochastic models of science dynamics and research productivity The book shows that many famous fat tail distributions as well as many deterministic and stochastic models and processes which are well known from physics theory of extreme events or population dynamics occur also in the description of dynamics of scientific systems and in the description of the characteristics of research productivity This is not a surprise as scientific systems are nonlinear open and dissipative

Advanced Engineering Thermodynamics Adrian Bejan, 2016-08-31 An advanced practical approach to the first and second laws of thermodynamics Advanced Engineering Thermodynamics bridges the gap between engineering applications and the first and second laws of thermodynamics Going beyond the basic coverage offered by most textbooks this authoritative treatment delves into the advanced topics of energy and work as they relate to various engineering fields This practical approach describes real world applications of thermodynamics concepts including solar

energy refrigeration air conditioning thermofluid design chemical design constructal design and more This new fourth edition has been updated and expanded to include current developments in energy storage distributed energy systems entropy minimization and industrial applications linking new technologies in sustainability to fundamental thermodynamics concepts Worked problems have been added to help students follow the thought processes behind various applications and additional homework problems give them the opportunity to gauge their knowledge The growing demand for sustainability and energy efficiency has shined a spotlight on the real world applications of thermodynamics This book helps future engineers make the fundamental connections and develop a clear understanding of this complex subject Delve deeper into the engineering applications of thermodynamics Work problems directly applicable to engineering fields Integrate thermodynamics concepts into sustainability design and policy Understand the thermodynamics of emerging energy technologies Condensed introductory chapters allow students to quickly review the fundamentals before diving right into practical applications Designed expressly for engineering students this book offers a clear targeted treatment of thermodynamics topics with detailed discussion and authoritative guidance toward even the most complex concepts Advanced Engineering Thermodynamics is the definitive modern treatment of energy and work for today's newest engineers

Three Worlds of Collective Human Experience: Individual Life, Social Change, and Human Evolution Victor N. Shaw, 2018-08-22 This book explores three worlds shared by the humans in their collective experiences It identifies and explores the world of commonsense the world of religion and the world of science as three essential dimensions of human experience The book helps understand that humans can gain comfort and pleasure in commonsense achieve meaning and purpose from religion and attain truth and rationality through science It actively applies theories to and develops theoretical explanations from different domains or situations of human existence This book is of interest to theorists researchers instructors and students across major academic disciplines in the humanities and social sciences

Unveiling the Magic of Words: A Review of "**Constructal Theory Of Social Dynamics**"

In a world defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their ability to kindle emotions, provoke contemplation, and ignite transformative change is truly awe-inspiring. Enter the realm of "**Constructal Theory Of Social Dynamics**," a mesmerizing literary masterpiece penned with a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve in to the book is central themes, examine its distinctive writing style, and assess its profound affect the souls of its readers.

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