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JAIR LEXI

Environmental Hydrology, Second Edition JHU Press
Catchment Hydrological Modelling: The Science and Art covers various methods (and equations) for modeling all components of a CHM. Readers are presented with multiple methods and approaches to modeling the same component, allowing them to distinguish the differences between methods. The books also provides a clear understanding of what makes some commonly used hydrological models similar or different and what their strengths and weaknesses may be. This comprehensive guide contains questions and answers in each chapter, along with concepts and detailed equations that are fundamental to understanding CHM. This book is useful to students and professionals in the fields of catchment and hydrology, as well as environmental and civil engineers. - Includes practical advice on developing and/or applying CHM models, empowering readers to do so themselves - Presents practical aspects of catchment modeling, from model structure design to model operation - Presents hydrological catchment modeling in a clear and coherent way while also describing different approaches for the same processes

Deep Learning for Hydrometeorology and Environmental Science McGraw Hill Professional
This new edition is a major revision of the popular introductory reference on hydrology and watershed management principles, methods, and applications. The book's content and scope have been improved and condensed, with updated chapters on the management of forest, woodland, rangeland, agricultural urban, and mixed land use watersheds. Case studies and examples throughout the book show practical ways to use web sites and the Internet to acquire data, update methods and models, and apply the latest technologies to issues of land and water use and climate variability and change.

Fundamentals of Hydrology Springer Science & Business Media
R. S. GOVINDARAJU and ARAMACHANDRA RAO School of Civil Engineering Purdue University West Lafayette, IN. , USA Background and Motivation The basic notion of artificial neural networks (ANNs), as we understand them today, was perhaps first formalized by McCulloch and Pitts (1943) in their model of an artificial neuron. Research in this field remained somewhat dormant in the early years, perhaps because of the limited capabilities of this method and because there was no clear indication of its potential uses. However, interest in this area picked up momentum in a dramatic fashion with the works of Hopfield (1982) and Rumelhart et al. (1986). Not only did these studies place artificial neural networks on a firmer mathematical footing, but also opened the dOOf to a host of potential applications for this computational tool. Consequently, neural network computing has progressed rapidly along all fronts: theoretical development of different learning algorithms, computing capabilities, and applications to diverse areas from neurophysiology to the stock market. . Initial studies on artificial neural networks were prompted by adesire to have computers mimic human learning. As a result, the jargon associated with the technical literature on this subject is replete with expressions such as excitation and inhibition of neurons, strength of synaptic connections, learning rates, training, and network experience. ANNs have also been referred to as neurocomputers by people who want to preserve this analogy.

Hydrology Handbook Academic Press
Hydrology in Practice is an excellent and very successful introductory text for engineering hydrology students who go on to be practitioners in consultancies, the Environment Agency, and elsewhere. This fourth edition of Hydrology in Practice, while retaining all that is excellent about its predecessor, by Elizabeth M. Shaw, replaces the material on the Flood Studies Report with an equivalent section on the methods of the Flood Estimation Handbook and its revisions. Other completely revised sections on instrumentation and modelling reflect the many changes that have occurred over recent years. The updated text has taken advantage of the extensive practical experience of the staff of JBA Consulting who use the methods described on a day-to-day basis. Topical case studies further enhance the text and the way in which students at undergraduate and MSc level can relate to it. The fourth edition will also have a wider appeal outside the UK by including new material on hydrological processes, which also relate to courses in geography and environmental science departments. In this respect the book draws on the expertise of Keith J. Beven and Nick A. Chappell, who have extensive experience of field hydrological studies in a variety of different environments, and have taught undergraduate hydrology courses for many years. Second- and final-year undergraduate (and MSc) students of hydrology in engineering, environmental science, and geography departments across the globe, as well as professionals in environmental protection agencies and consultancies, will find this book invaluable. It is likely to be the course text for every undergraduate/MSc hydrology course in the UK and in many cases overseas too.

Stream Hydrology John Wiley & Sons
This book provides a step-by-step methodology and derivation of deep learning algorithms as Long Short-Term Memory (LSTM) and Convolution Neural Network (CNN), especially for estimating parameters, with back-propagation as well as examples with real datasets of hydrometeorology (e.g. streamflow and temperature) and environmental science (e.g. water quality). Deep learning is known as part of machine learning methodology based on the artificial neural network. Increasing data availability and computing power enhance applications of deep learning to hydrometeorological and environmental fields. However, books that specifically focus on applications to these fields are limited. Most of deep learning books demonstrate theoretical backgrounds and mathematics. However, examples with real data and step-by-step explanations to understand the algorithms in hydrometeorology and environmental science are very rare. This book focuses on the explanation of deep learning techniques and their applications to hydrometeorological and environmental studies with real hydrological and environmental data. This book covers the major deep learning algorithms as Long Short-Term Memory (LSTM) and Convolution Neural Network (CNN) as well as the conventional artificial neural network model.

Distributed Hydrologic Modeling Using GIS Springer Science & Business Media
In order to manage the world's increasingly scarce water resources we must have a sound understanding of how water moves around the planet and what influences water quality. Fundamentals of Hydrology provides an engaging and comprehensive introduction to this subject and provides real-life examples of water resource management in a changing world. The second edition of this popular book brings the text up-to-date with additional case studies and diagrams and a greater synthesis of water quality with physical hydrology. The chapters on runoff and evaporation have been updated and the final chapter on hydrology in a changing world has more material on water resource management strategies. Additionally the chapter on streamflow analysis now includes a more in-depth section on modelling runoff. The book begins with a comprehensive coverage of precipitation, evaporation, water stored in the ground and as snow and ice, and runoff. These physical hydrological processes show with respect to the fundamental knowledge about the process, its measurement and estimation and how it ties in with water quality. Following this is a section on analyzing streamflow data, including using computer models and combining hydrology and ecology for in-stream flow assessment. A chapter on water quality shows how to measure and estimate it in a variable environment and finishes with a section on pollution treatment. The final chapter brings the text together to discuss water resource management andreal-life issues that are faced by hydrologists in a constantly changing world. Fundamentals of Hydrology is a lively and accessible introduction to the study of hydrology at university level. This new edition continues to provide an understanding of hydrological processes, knowledge of the techniques used to assess water resources and an up-to-date overview of water resource management in a changing world. Throughout the text, wide-ranging examples and case studies are used to clearly explain ideas and methods. Short chapter summaries, essay questions, guides to further reading and a glossary are also included.

Hydrology : Principles, Analysis And Design University of Georgia Press
Karst is characterized particularly by special landforms and sub surface drainage. The various actions of water result in numerous variations of surface and sub-surface karst forms. They also bring about distinctive geologic-morphologic forms, and more striking ly, specific flora and fauna. The scientific discipline of hydrology, although a long-established science, cannot easily be applied to karst regions with their very complex drainage system. A special approach is therefore necessary to understand and predict water circulation in these areas. This is the viewpoint we must adopt if hydrology is to solve the complex problems of karst phenomena. This book can be seen as the appeal of a hydrologist to experts from different scientific dis ciplines (geology, hydrology, geomorphology, geography, geo physics, meteorology, ecology, civil engineering, forestry, agricul ture, etc.) to collaborate towards a better understanding of karst areas. Evidently, karst phenomena have not been sufficiently and carefully studied worldwide. It is equally true that the first theories on water circulation in karst were developed according to ex periences in the Dinaric karst. This can easily be explained. In habitants in those areas had no place to which to escape, as was the case in other countries.

Lake Hydrology Cambridge University Press
Stream Ecosystems in a Changing Environment synthesizes the current understanding of stream ecosystem ecology, emphasizing nutrient cycling and carbon dynamics, and providing a forward-looking perspective regarding the response of stream ecosystems to environmental change. Each chapter includes a section focusing on anticipated and ongoing dynamics in stream ecosystems in a changing environment, along with hypotheses regarding controls on stream ecosystem functioning. The book, with its innovative sections, provides a bridge between papers published in peer-reviewed scientific journals and the findings of researchers in new areas of study. - Presents a forward-looking perspective regarding the response of stream ecosystems to environmental change - Provides a synthesis of the latest findings on stream ecosystems ecology in one concise volume - Includes thought exercises and discussion activities throughout, providing valuable tools for learning - Offers conceptual models and hypotheses to stimulate conversation and advance research

Catchment Hydrological Modelling Elsevier
A special workshop on scale problems in hydrology was held at Princeton University, Princeton, New Jersey, during October 31-November 3, 1984. This workshop was the second in a series on this general topic. The proceedings of the first workshop, held in Caracas, Venezuela, in January 1982, appeared in the Journal of Hydrology (Volume 65:1/3, 1983). This book contains the papers presented at the second workshop. The scale problems in hydrology and other geophysical sciences stem from the recognition that the mathematical relationships describing a physical phenomenon are mostly scale dependent in the sense that different relationships manifest at different space-time scales. The broad scientific problem then is to identify and for mulate suitable relationships at the scales of practical interest, test them experimen tally and seek consistent analytical connections between these relationships and those known at other scales. For example, the current hydrologic theories of evaporation, infiltration, subsurface water transport and water sediment transport overland and in channels etc. derive mostly from laboratory experiments and therefore generally apply at "small" space-time scales. A rigorous extrapolation of these theories to large spatial and temporal basin scales, as mandated by practical considerations, appears very difficult. Consequently, analytical formulations of suitable hydrologic theories at basin wide space-time scales and their experimental verification is currently being perceived to be an exciting and challenging area of scientific research in hydrology. In order to successfully meet these challenges in the future, this series of workshops was initiated.

Extreme Hydrology and Climate Variability Elsevier
Principles of Snow Hydrology describes the factors that control the accumulation, melting and runoff of water from seasonal snowpacks over the surface of the earth. The book addresses not only the basic principles governing snow in the hydrologic cycle, but also the latest applications of remote sensing, and techniques for modeling streamflow from snowmelt across large mixed land-use river basins. Individual chapters are devoted to climatology and distribution of snow, snowpack energy exchange, snow chemistry, ground-based measurements and remote sensing of snowpack characteristics, snowpack management, and modeling snowmelt runoff. Many chapters have review questions and problems with solutions available online. This book is a reference book for practicing water resources managers and a text for advanced hydrology and water resources courses which span fields such as engineering, earth sciences, meteorology, biogeochemistry, forestry and range management, and water resources planning.

Hydrology CRC Press
Data on water quality and other environmental issues are being collected at an ever-increasing rate. In the past, however, the techniques used by scientists to interpret this data have not progressed as quickly. This is a book of modern statistical methods for analysis of practical problems in water quality and water resources.The last fifteen years have seen major advances in the fields of exploratory data analysis (EDA) and robust statistical methods. The 'real-life' characteristics of environmental data tend to drive analysis towards the use of these methods. These advances are presented in a practical and relevant format.

Alternate methods are compared, highlighting the strengths and weaknesses of each as applied to environmental data. Techniques for trend analysis and dealing with water below the detection limit are topics covered, which are of great interest to consultants in water-quality and hydrology, scientists in state, provincial and federal water resources, and geological survey agencies.The practising water resources scientist will find the worked examples using actual field data from case studies of environmental problems, of real value. Exercises at the end of each chapter enable the mechanics of the methodological process to be fully understood, with data sets included on diskette for easy use. The result is a book that is both up-to-date and immediately relevant to ongoing work in the environmental and water sciences.

Elements of Physical Hydrology Academic Press

Students and professors of hydrology, ecology, land-use management, forest and range management, soil science, physical geography, soil and water conservation, and watershed management will welcome this revision of the 1969 edition of An Outline of Forest Hydrology by John D. Hewlett and Wade L. Nutter. The student pursuing a career in forest and wildland resources soon learns that no science is more fundamental to the art of land management than hydrology, but hydrology as a science traditionally has been subordinated to hydrology as technique. Older texts have focused on methods and applications to the exclusion of principle, occasionally leaving the hydrological effects of land use and vegetation to be interpreted from techniques rather than from knowledge of process. Soil, atmospheric, and vegetal phases of the hydrologic cycle of have neglected in many texts intended for the college student. Hewlett’s new book focuses on natural processes and is intended to guide further study and to serve as a base for class lectures. The subject matter is organized to introduce key ideas and principles and to provide consistent terminology and clear graphic material to aid the student in comprehending the complex literature of hydrology.

Isotope Tracers in Catchment Hydrology Springer Nature

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Rivers of Europe Springer Science & Business Media

The most cogent textbook ever produced on the topic, this revised and expanded edition will be welcomed by students and professionals alike. Among the many diverse aspects of environmental science, none is more critical to the future of society and nature than water. Understanding the role of water on Earth and making good decisions regarding water conservation and hydrological hazards depends on learning the fundamentals of physical hydrology. This textbook, now in an expanded second edition, provides the clearest opportunity for students to absorb those fundamentals. Written at an introductory level, Elements of Physical Hydrology covers virtually every aspect of this subject, including: • The hydrological cycle • Water budgets at catchment to global scales • Spatial and temporal aspects of precipitation • Evapotranspiration • Fluid dynamics and the Bernoulli equation • Laminar and turbulent flows • Open channel flow • Flood movement through reservoirs and channels • Flood frequency analysis • Groundwater flow • Aquifer characterization • Land subsidence • Soil moisture dynamics • Flow in the unsaturated zone • Hydrologic controls on vegetation • Biotic controls on hydrological processes • Runoff generation from surface and subsurface sources • Catchment models • The water-food-energy nexus • The globalization of water • Impacts of changing climate Layering one topic upon the next, Elements of Physical Hydrology succeeds in moving from simple, easy-to-grasp explanations through equations and models in a manner that will leave students new to the topic eager to apply their knowledge. Professionals in related disciplines will also find this book ideal for self-study. Thoughtfully illustrated, carefully written, and covering a broad spectrum of topics, this classic text clarifies a subject that is often misunderstood and oversimplified.

Groundwater in Geologic Processes John Wiley & Sons

This book presents a unique and up-to-date summary of what is known about groundwater on our planet, from a global perspective and in terms of area-specific factual information. Unlike most textbooks on groundwater, it does not deal with theoretical principles, but rather with the overall picture that emerges as a result of countless observations,

Handbook of Applied Hydrology, Second Edition Waveland Press

An attempt is made to place before students (degree and post-degree) and professionals in the fields of Civil and Agricultural Engineering, Geology and Earth Sciences, this important branch of Hydroscience, i.e., Hydrology. It deals with all phases of the Hydrologic cycle and related opics in a lucid style and in metric system. There is a departure from empiricism, with emphasis on collection of hydrological data, processing and analysis of data, and hydrological design on sound principles and matured judgement. Large number of hydrological design problems are worked out at the end of each article, to illustrate the principles involved and the design procedure. Problems for assignment are given at the end of each chapter, along with objective type and intelligence questions.

Global Physical Climatology Academic Press

MOP 28 serves as a basic reference, providing a thorough, up-to-date guide for hydrologists.

Dryland Ecohydrology Elsevier

The first book dedicated to describing the hydrology of water flow in lake systems, geared for limnologists and students of hydrology. With fresh water becoming a critical issue around the world, lake mass balance—the hydrology or water movement in lakes—is increasingly important to environmental studies and remediation projects. Unfortunately, lake hydrology is often only briefly covered in broader texts on hydrogeology and hydrology or is confined to specialized research papers. Lake Hydrology rigorously describes the hydrology of flow into and out of lake systems. Explaining the physical parameters that influence lake behavior, as well as the mathematics that describes these systems, this in-depth book fills an important niche in the literature of watershed science. This text • describes the physical structure and nature of drainage basins and explains the origin and classification of lakes • explores the hydrology of lake mass balance and storage as it pertains to lake stage, groundwater and lake bottom interaction, hypsometry, lake hydraulics, precipitation, surface flow, evaporation, and transpiration • provides models, practical information, and solutions for lake management or remediation planning utilizing basic data, including stage fluctuation, evapotranspiration, lake-bottom seepage, precipitation, and surface flow • uses examples from real-world long-term studies, including Utah's Great Salt Lake and Florida's Lake Jackson, a karstic lake system • examines the effect of storm events including the temporal and areal distribution of rainfall, and flow paths of water in the catchment from precipitation • includes an introduction to relevant scientific principles, such as dimensional analysis, the properties of water, and the hydrologic cycle Unlike most limnology texts, which emphasize lake ecology and biology, Lake Hydrology is designed to truly elucidate the hydrology of lake systems, especially as it relates to components of the hydrologic cycle. This book will greatly benefit professionals and researchers involved in lake management, remediation, or investigation of lake systems, and can be used as is or integrated within graduate and advanced undergraduate courses in limnology.

Groundwater around the World Routledge

Increasing demand for water, higher standards of living, depletion of resources of acceptable quality, and excessive water pollution due to urban, agricultural, and industrial expansions have caused intense environmental, social, economic, and political predicaments. More frequent and severe floods and droughts have changed the resiliency and ability of water infrastructure systems to operate and provide services to the public. These concerns and issues have also changed the way we plan and manage our surface and groundwater resources. Groundwater Hydrology: Engineering, Planning, and Management, Second Edition presents a compilation of the state-of-the-art subjects and techniques in the education and practice of groundwater and describes them in a systematic and integrated fashion useful for undergraduate and graduate students and practitioners. This new edition features updated materials, computer codes, and case studies throughout. Features: Discusses groundwater hydrology, hydraulics, and basic laws of groundwater movement Describes environmental water quality issues related to groundwater, aquifer restoration, and remediation techniques, as well as the impacts of climate change \ Examines the details of groundwater modeling and simulation of conceptual models Applies systems analysis techniques in groundwater planning and management Delineates the modeling and downscaling of climate change impacts on groundwater under the latest IPCC climate scenarios Written for students as well as practicing water resource engineers, the book develops a system view of groundwater fundamentals and model-making techniques through the application of science, engineering, planning, and management principles. It discusses the classical issues in groundwater hydrology and hydraulics followed by coverage of water quality issues. It also introduces basic tools and decision-making techniques for future groundwater development activities, taking into account regional sustainability issues. The combined coverage of engineering and planning tools and techniques, as well as specific challenges for restoration and remediation of polluted aquifers sets this book apart.

Groundwater Science Amer Society of Civil Engineers

This book represents a new "earth systems" approach to catchments that encompasses the physical and biogeochemical interactions that control the hydrology and biogeochemistry of the system. The text provides a comprehensive treatment of the fundamentals of catchment hydrology, principles of isotope geochemistry, and the isotope variability in the hydrologic cycle -- but the main focus of the book is on case studies in isotope hydrology and isotope geochemistry that explore the applications of isotope techniques for investigating modern environmental problems. Isotope Tracers in Catchment Hydrology is the first synthesis of physical hydrology and isotope geochemistry with catchment focus, and is a valuable reference for professionals and students alike in the fields of hydrology, hydrochemistry, and environmental science. This important interdisciplinary text provides extensive guidelines for the application of isotope techniques for all investigatores facing the challenge of protecting precious water, soil, and ecological resources from the ever-increasing problems associated with population growth and environmental change, including those from urban development and agricultural land uses.