

The Importance of Numeric Databases to Materials Science

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Scientific numeric databases are important research tools for materials scientists. In distinction to bibliographic databases, these numeric databases are useful primarily to provide direct, immediate access to data, often evaluated data. Examples showing the application of crystallographic databases are given, including determining candidate materials for certain applications. Thermochemical data useful for optimizing optical fiber processing are discussed

showing the importance of high-quality data. In addition, these databases are an important tool that can be utilized in the graduate education of the next generation of materials scientists.

Key words: CRYSTDAT; industrial use of numeric databases; lattice matching; materials science; numeric databases; on-line searching; prediction of ferroelectricity; superconductivity.

Introduction

In this introduction, I would like to briefly point out some aspects of the importance of numerical databases to materials sciences, specifically the importance of good data and the quick dissemination of numeric data to a wide audience. All the examples that are mentioned come from the work at AT&T Bell Laboratories.

If one were to claim that numeric databases were the most important development in materials science, that would clearly be an overstatement. On the other hand, if one were to claim that they are of no value to materials science, that would be understating their importance. The importance lies in between and can be expected to increase as knowledge of them becomes more widely known. Many of these databases, specifically in the crystallographic area, have developed from print products that existed for decades and putting them into numeric databases is a shift in content and in means of

access. But it's more than that, much more than that. As with many new technologies, there are uses that are unanticipated when a new technology first appears. The usual advantages of having data in numeric form include the following: they're easy to update, there's a potentially faster delivery of information to the user, and there's a potentially large audience of scientists and engineers that can be reached by having the data in the electronic form, because these people can access this data by their personal computer or microcomputer in the laboratory, the office, or even at home.

I want to point to several examples. First, I'll discuss one of the main processes for making optical fibers, which I'll spend the most time on, and which will illustrate the need for good data. Other examples I will mention are the prediction of ferroelectricity, lattice matching, and high-T_c superconductivity. I'll close with a lesson from history.

Numeric Databases

Ching-chih Chen, Peter Hernon



Numeric Databases:

Numeric Databases in Materials and Biological Sciences ,1989 *Numeric Databases* Ching-chih Chen,Peter Hernon,1984 The purpose of this book is to provide readers with the fundamentals of numeric databases and draw attention to them their value and utility to libraries and information centers The public needs access to information which does not always appear in print format Libraries and information centers must be aware of these resources and recognize that they are essential information sources for a growing number of subjects Subjects where the use of large sets of statistical data is becoming common are particularly important This book is aimed at those readers wanting an introduction to many facets of the subject **Numeric Databases** ,1982 **Considerations of Online Numeric Databases for Social Science Research** Lisa Stewart,Rand Corporation,1983 In an age of lightning fast information online numeric databases may seem a godsend to data users Tantalizing with its instant information and powerful data manipulating packages online data retrieval fulfills yesterday is not too soon requests to the delight of information specialists However while these databases dazzle us up front we must not forget to examine carefully basic reliability and cost issues Items needing to be scrutinized include data type and level availability source identification and data equivalency data verification documentation software timeliness and cost This paper is oriented to information specialists and was presented on May 21 1983 at the IASSIST International Association for Social Science Information Service and Technology Conference in Philadelphia Pennsylvania Author Database ,1993 Agricultural Databases Directory Martha E. Williams,Carolyn G. Robins,1985 Een overzicht van 428 internationale databases en databasesystemen met specifieke gegevens **Directory of Factual and Numeric Databases of Relevance to Aerospace and Defence R & D** ,1992 **Numeric Data Products and Services** ,2001

Encyclopedia of Library and Information Science Allen Kent,1986-02-28 The Encyclopedia of Library and Information Science provides an outstanding resource in 33 published volumes with 2 helpful indexes This thorough reference set written by 1300 eminent international experts offers librarians information computer scientists bibliographers documentalists systems analysts and students convenient access to the techniques and tools of both library and information science Impeccably researched cross referenced alphabetized by subject and generously illustrated the Encyclopedia of Library and Information Science integrates the essential theoretical and practical information accumulating in this rapidly growing field Manual of Online Search Strategies C.J. Armstrong,J.A. Large,2018-12-20 Published in 1992 like the first this second edition is not intended as introductory textbook command driven Boolean searching It is targeted at online searchers who already have some knowledge of command languages and may be proficient searchers on databases in one or two subject areas but when required to venture into new and less familiar territory still need guidance It is also offered to end users who possess the subject expertise but lack of information retrieval know how The Manual is offered as a guide to database selection and a navigational aid through the twists and turns of the retrieval maze at least some of the dead ends

and backtracking may thereby be avoided This volume written by experts in their various fields deals with the subject coverage and record structures of specific databases offers comparisons between databases context indexing procedures updating policies etc discusses the choice between online and CD ROM sources and between hosts if online is selected and illustrates strategies with numerous search extracts Environmental Systems - Volume II Achim Sydow, 2010-09-27

Environmental Systems is a component of Encyclopedia of Environmental and Ecological Sciences Engineering and Technology Resources in the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty one Encyclopedias Environmental Systems is something about data handling modeling and decision making in the field of environmental systems It includes related basic knowledge on measurement techniques modeling techniques and models and their applications for decisions making Environmental engineering research are based on measurement techniques and related knowledge of natural and life sciences Developed mathematical and numerical simulation models are tools and strictly purpose oriented that means suitable for decision making The three volumes on Environmental Systems 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 *Scientific and Technical Data in a New Era* Phyllis S. Glaeser, 1990 Topics dealt with Bioscience and biotechnology Industry and technology Safety and environmental protection Geo and space sciences Scientific aspects of collecting and distributing data Legal and social aspects of data dissemination Innovations in data handling

A Question of Balance National Research Council, Division on Engineering and Physical Sciences, Commission on Physical Sciences, Mathematics, and Applications, Committee for a Study on Promoting Access to Scientific and Technical Data for the Public Interest, 2000-01-15 New legal approaches such as the European Union's 1996 Directive on the Legal Protection of Databases and other legal initiatives now being considered in the United States at the federal and state level are threatening to compromise public access to scientific and technical data available through computerized databases Lawmakers are struggling to strike an appropriate balance between the rights of database rights holders who are concerned about possible commercial misappropriation of their products and public interest users of the data such as researchers educators and libraries A Question of Balance examines this balancing act The committee concludes that because database rights holders already enjoy significant legal technical and market based protections the need for statutory protection has not been sufficiently substantiated Nevertheless although the committee opposes the creation of any strong new protective measures it recognizes that some additional limits against wholesale misappropriation of databases may be necessary In particular a new properly scoped and focused U S statute might provide a reasonable alternative to the European Union's highly protectionistic database directive Such legislation could then serve as a legal model for an international treaty in this area The book recommends a number of guiding principles for such possible legislation as well as related policy actions for the administration

Computerization and Networking of Materials

Databases Thomas Ian Barry, K. Reynard, 1992 Papers presented at the symposium on the Computerization and Use of Materials Property Data held in Cambridge UK September 1991 sponsored by the ASTM and the UK National Physical Laboratory The volume is divided into four sections standards and data representation integration of materials i

The Upper Atmosphere Walter Dieminger, Gerd K. Hartmann, Reinhart Leitinger, 2012-12-06 Especially due to the increasing environmental problems there is a need to collect as many data as possible in the upper atmosphere This book serves as a general multidisciplinary guide and introduction for a more effective use of the large amount of now available data from the Earth's atmosphere It also shows the problems of the use of large amounts of time series data for basic science as well as for environmental monitoring and the related information systems The book is aimed for scientists and students interested in the Earth's atmosphere which is vital for the understanding of environmental changes in the global system Earth

Organizing Knowledge Jennifer Rowley, Richard Hartley, 2017-05-15 The fourth edition of this standard student text Organizing Knowledge incorporates extensive revisions reflecting the increasing shift towards a networked and digital information environment and its impact on documents information knowledge users and managers Offering a broad based overview of the approaches and tools used in the structuring and dissemination of knowledge it is written in an accessible style and well illustrated with figures and examples The book has been structured into three parts and twelve chapters and has been thoroughly updated throughout Part I discusses the nature structuring and description of knowledge Part II with its five chapters lies at the core of the book focusing as it does on access to information Part III explores different types of knowledge organization systems and considers some of the management issues associated with such systems Each chapter includes learning objectives a chapter summary and a list of references for further reading This is a key introductory text for undergraduate and postgraduate students of information management

Information Technology (Applications) Mr. Rohit Manglik, 2024-02-15 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels

Marketing Database Analytics Andrew D. Banasiewicz, 2013-08-06 Marketing Database Analytics presents a step by step process for understanding and interpreting data in order to gain insights to drive business decisions One of the core elements of measuring marketing effectiveness is through the collection of appropriate data but this data is nothing but numbers unless it is analyzed meaningfully Focusing specifically on quantitative marketing metrics the book Covers the full spectrum of marketing analytics from the initial data setup and exploration to segmentation behavioral predictions and impact quantification Establishes the importance of database analytics integrating both business and marketing practice Provides a theoretical framework that explains the concepts and delivers techniques for analyzing data Includes cases and exercises to guide students learning Banasiewicz integrates his knowledge from both his academic training and professional

experience providing a thorough comprehensive approach that will serve graduate students of marketing research and analytics well **Data for Science and Technology** Phyllis S. Glaeser, 2013-10-22 Data for Science and Technology covers the proceedings of the Seventh International CODATA Conference This text is comprised of 133 chapters with a total of 180 papers from 400 hundred authors which cover CODATA concerned with environmental and energy questions along with problems of data banking and telecommunications network operations This book provides valuable assessment of data and points out alternatives trends and requirements for the future such as production and use of data in pure applied sciences data for the development of human settlements in a dynamic world informatical analysis of scientific research activities and data on our evolutionary heritage Researchers from all scientific fields will find this book a great source reference material since it presents research from various disciplines Bibliographies and Literature of Agriculture ,1978

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