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Euro-Par'97 Parallel Processing - Christian Lengauer 2006-04-10
This book constitutes the refereed proceedings of the Third International Euro-Par Conference, held in Passau, Germany, in August 1997. The 178 revised papers presented were selected from more than 300 submissions on the basis of 1101 reviews. The papers are organized in accordance with the conference workshop structure in tracks on support tools and environments, routing and communication, automatic parallelization, parallel and distributed algorithms, programming languages, programming models and methods, numerical algorithms, parallel architectures, HPC applications, scheduling and load balancing, performance evaluation, instruction-level parallelism, database systems, symbolic computation, real-time systems, and an ESPRIT workshop.
Introduction to Parallel and Vector Solution of Linear Systems - James M. Ortega 1988-04-30
Although the origins of parallel computing go back to the last century, it was only in the 1970s that parallel and vector computers became available to the scientific community. The first of these machines-the 64 processor llliac IV and the vector computers built by Texas Instruments, Control Data Corporation, and then CRA Y Research Corporation-had a somewhat limited impact. They were few in number and available mostly to workers in a few government laboratories. By now, however, the trickle has become a flood. There are over 200 large-scale vector computers now installed, not only in government laboratories but also in universities and in an increasing diversity of industries. Moreover, the National Science Foundation's Super computing Centers have made large vector computers widely available to the academic community. In addition, smaller, very cost-effective vector computers are being manufactured by a number of companies. Parallelism in computers has also progressed rapidly. The largest super computers now consist of several vector processors working in parallel. Although the number of processors in such machines is still relatively small (up to 8), it is expected that an increasing number of processors will be added in the near future (to a total of 16 or 32). Moreover, there are a myriad of research projects to build machines with hundreds, thousands, or even more processors. Indeed, several companies are now selling parallel machines, some with as many as hundreds, or even tens of thousands, of processors.

Introduction to the Practice of Statistics Study Guide with Solutions Manual - Michael A. Fligner 2008-06-27
With a focus on data analysis, statistical reasoning, and the way statisticians actually work, this book has helped revolutionize the way statistics are taught and brings the power of critical thinking and practical applications to your course. This sixth edition has been updated with new content.

Parallel Computing Works! - Geoffrey C. Fox 2014-06-28
A clear illustration of how parallel computers can be successfully applied to large-scale scientific computations. This book demonstrates how a variety of applications in physics, biology, mathematics and other sciences were implemented on real parallel computers to produce new scientific results. It investigates issues of fine-grained parallelism relevant for future supercomputers with particular emphasis on hypercube architecture. The authors describe how they used an experimental approach to configure different massively parallel machines, design and implement basic system software, and develop algorithms for frequently used mathematical computations. They also devise performance models, measure the performance characteristics of several computers, and create a high-performance computing facility based exclusively on parallel computers. By addressing all issues involved in scientific problem solving, Parallel Computing Works! provides valuable insight into computational science for large-scale parallel architectures. For those in the sciences, the findings reveal the usefulness of an important experimental tool. Anyone in supercomputing and related computational fields will gain a new perspective on the potential contributions of parallelism. Includes over 30 full-color illustrations.
Analysis and Design of Scalable Parallel Algorithms for Scientific Computing - Anshul Gupta 1995

Transputer Applications and Systems '94 - A. De Gloria 1994
Proceedings -- Parallel Computing.
Euro-Par 2004 Parallel Processing - International Euro-par Conference 2004 P 2004-08-19
This book constitutes the refereed proceedings of the 10th International Conference on Parallel Computing, Euro-Par 2004, held in Pisa, Italy in August/September 2004. The 122 revised papers presented together with 3 invited papers were carefully reviewed and selected from 352 submissions. The papers are organized in topical sections on support tools and environments, performance evaluation, scheduling and load balancing, compilers and high performance, parallel and distributed databases, grid and cluster computing, applications on high performance clusters, parallel computer architecture and ILP, distributed systems and algorithms, parallel programming, numerical algorithms, high performance multimedia, theory and algorithms for parallel computing, routing and communication in interconnection networks, mobile computing, integrated problem solving environments, high performance bioinformatics, and peer-to-peer and Web computing.
Parallel Programming - Thomas Rauber 2010-03-10
Innovations in hardware architecture, like hyper-threading or multicore processors, mean that parallel computing resources are available for inexpensive desktop computers. In only a few years, many standard software products will be based on concepts of parallel programming implemented on such hardware, and the range of applications will be much broader than that of scientific computing, up to now the main application area for parallel computing. Rauber and Rünger take up these recent developments in processor architecture by giving detailed descriptions of parallel programming techniques that are necessary for developing efficient programs for multicore processors as well as for parallel cluster systems and supercomputers. Their book is structured in three main parts, covering all areas of parallel computing: the architecture of parallel systems, parallel programming models and environments, and the implementation of efficient application algorithms. The emphasis lies on parallel programming techniques needed for different architectures. The main goal of the book is to present parallel programming techniques that can be used in many situations for many application areas and which enable the reader to develop correct and efficient parallel programs. Many examples and exercises are provided to show how to apply the techniques. The book can be used as both a textbook for students and a reference book for professionals. The presented material has been used for courses in parallel programming at different universities for many years.
Scientific Computing - Gene Howard Golub 1993
This text introduces the basic concepts of parallel and vector computing

in the context of an introduction to numerical methods. It has chapters on parallel and vector matrix multiplication and solution of linear systems by direct and iterative methods. It should be suitable for advanced undergraduate and beginning graduate courses in computer science, applied mathematics and engineering. Ideally, students will have access to a parallel or vector computer, but the material can be studied profitably in any case.

Parallel and Distributed Computation: Numerical Methods - Dimitri Bertsekas 2015-03-01
This highly acclaimed work, first published by Prentice Hall in 1989, is a comprehensive and theoretically sound treatment of parallel and distributed numerical methods. It focuses on algorithms that are naturally suited for massive parallelization, and it explores the fundamental convergence, rate of convergence, communication, and synchronization issues associated with such algorithms. This is an extensive book, which aside from its focus on parallel and distributed algorithms, contains a wealth of material on a broad variety of computation and optimization topics. It is an excellent supplement to several of our other books, including Convex Optimization Algorithms (Athena Scientific, 2015), Nonlinear Programming (Athena Scientific, 1999), Dynamic Programming and Optimal Control (Athena Scientific, 2012), Neuro-Dynamic Programming (Athena Scientific, 1996), and Network Optimization (Athena Scientific, 1998). The on-line edition of the book contains a 95-page solutions manual.

Introduction to Parallel Computing - Wesley P. Petersen 2004
This is a practical student guide to scientific computing on parallel computers, working up from a hardware instruction level, to shared memory machines, and finally to distributed memory machines.

Recent Advances in Parallel Virtual Machine and Message Passing Interface - European Pvm 1997-10-15
This book constitutes the refereed proceedings of the 4th European Parallel Virtual Machine and Message Passing Interface Users' Group Meeting, PVM/MPI '97, held in Cracow, Poland in November 1997. Parallel Virtual Machine and Message Passing Interface are the most popular tools for programming in accordance with the message passing paradigm which, at present, is considered to be the best way to develop effective parallel programs. The book presents 63 carefully selected papers covering the whole range of PVM/MPI issues. The papers are organized in sections on evaluation and performance, extensions and improvements, implementation, tools, algorithms, and applications in science and engineering.

Introduction to Parallel Programming - Subodh Kumar 2022-07-31
In modern computer science, there exists no truly sequential computing system; and most advanced programming is parallel programming. This is particularly evident in modern application domains like scientific computation, data science, machine intelligence, etc. This lucid introductory textbook will be invaluable to students of computer science and technology, acting as a self-contained primer to parallel programming. It takes the reader from introduction to expertise, addressing a broad gamut of issues. It covers different parallel programming styles, describes parallel architecture, includes parallel programming frameworks and techniques, presents algorithmic and analysis techniques and discusses parallel design and performance issues. With its broad coverage, the book can be useful in a wide range of courses; and can also prove useful as a ready reckoner for professionals in the field.

Proceedings of the Seventh SIAM Conference on Parallel Processing for Scientific Computing - David H. Bailey 1995-01-01
Proceedings -- Parallel Computing.

Euro-Par 2008 Workshops - Parallel Processing - Eduardo César 2009-04-09
Parallel and distributed processing, although within the focus of computer science research for a long time, is gaining more and more importance in a wide spectrum of applications. These proceedings aim to demonstrate the use of parallel and distributed processing concepts in different application fields, and attempt to spark interest in novel research directions to parallel and high-performance computing research in general. The objective of these workshops is to specifically address

researchers coming from university, industry and governmental research organizations and application-oriented companies in order to close the gap between purely scientific research and the applicab- ity of the research ideas to real-life problems. Euro-Par is an annual series of international conferences dedicated to the pro- tion and advancement of all aspects of parallel and distributed computing. The 2008 event was the 14th issue of the conference. Euro-Par has for a long time been eager to attract colocated events sharing the same goal of promoting the dev- opment of parallel and distributed computing, both as an industrial technique and an academic discipline, extending the frontier of both the state of the art and the state of the practice. Since 2006, Euro-Par has been offering researchers the chance to co- cate advanced technical workshops back-to-back with the main conference.

Parallel Computing - Christian Bischof 2008
ParCo2007 marks a quarter of a century of the international conferences on parallel computing that started in Berlin in 1983. The aim of the conference is to give an overview of the developments, applications and future trends in high-performance computing for various platforms.

Introduction to High Performance Scientific Computing - Victor Eijkhout 2010
This is a textbook that teaches the bridging topics between numerical analysis, parallel computing, code performance, large scale applications.

Introduction to Parallel Computing - Ananth Grama 2003
A complete source of information on almost all aspects of parallel computing from introduction, to architectures, to programming paradigms, to algorithms, to programming standards. It covers traditional Computer Science algorithms, scientific computing algorithms and data intensive algorithms.

Numerical Solution of Partial Differential Equations on Parallel Computers - Are Magnus Bruaset 2006-03-05
Since the dawn of computing, the quest for a better understanding of Nature has been a driving force for technological development. Groundbreaking achievements by great scientists have paved the way from the abacus to the supercomputing power of today. When trying to replicate Nature in the computer's silicon test tube, there is need for precise and computable process descriptions. The scienti?c ?elds of Ma- ematics and Physics provide a powerful vehicle for such descriptions in terms of Partial Differential Equations (PDEs). Formulated as such equations, physical laws can become subject to computational and analytical studies. In the computational setting, the equations can be discreti ed for ef?cient solution on a computer, leading to valuable tools for simulation of natural and man-made processes. Numerical so- tion of PDE-based mathematical models has been an important research topic over centuries, and will remain so for centuries to come. In the context of computer-based simulations, the quality of the computed results is directly connected to the model's complexity and the number of data points used for the computations. Therefore, computational scientists tend to ?ll even the largest and most powerful computers they can get access to, either by increasing the si e of the data sets, or by introducing new model terms that make the simulations more realistic, or a combination of both. Today, many important simulation problems can not be solved by one single computer, but calls for parallel computing.

Parallel Computing Technologies - Victor Malyshkin 2003-07-31
This book constitutes the refereed proceedings of the 5th International Congress on Parallel Computing Technologies, PaCT-99, held in St. Petersburg, Russia in September 1999. The 47 revised papers presented were carefully reviewed and selected from more than 100 submissions. The papers address all current issues in parallel processing ranging from theory, algorithms, programming, and software to implementation, architectures, hardware, and applications.

Distributed and Cloud Computing - Kai Hwang 2013-12-18
Distributed and Cloud Computing: From Parallel Processing to the Internet of Things offers complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing. It is the first modern, up-to-date distributed systems textbook; it explains how to create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative

applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing. The principles of cloud computing are discussed using examples from open-source and commercial applications, along with case studies from the leading distributed computing vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course—each chapter includes exercises and further reading, with lecture slides and more available online

Data Mining: Concepts and Techniques - Jiawei Han 2011-06-09 Data Mining: Concepts and Techniques provides the concepts and techniques in processing gathered data or information, which will be used in various applications. Specifically, it explains data mining and the tools used in discovering knowledge from the collected data. This book is referred as the knowledge discovery from data (KDD). It focuses on the feasibility, usefulness, effectiveness, and scalability of techniques of large data sets. After describing data mining, this edition explains the methods of knowing, preprocessing, processing, and warehousing data. It then presents information about data warehouses, online analytical processing (OLAP), and data cube technology. Then, the methods involved in mining frequent patterns, associations, and correlations for large data sets are described. The book details the methods for data classification and introduces the concepts and methods for data clustering. The remaining chapters discuss the outlier detection and the trends, applications, and research frontiers in data mining. This book is intended for Computer Science students, application developers, business professionals, and researchers who seek information on data mining. Presents dozens of algorithms and implementation examples, all in pseudo-code and suitable for use in real-world, large-scale data mining projects Addresses advanced topics such as mining object-relational databases, spatial databases, multimedia databases, time-series databases, text databases, the World Wide Web, and applications in several fields Provides a comprehensive, practical look at the concepts and techniques you need to get the most out of your data

Introduction to Parallel Computing - Zbigniew J. Czech 2017-01-11 The constantly increasing demand for more computing power can seem impossible to keep up with. However, multicore processors capable of performing computations in parallel allow computers to tackle ever larger problems in a wide variety of applications. This book provides a comprehensive introduction to parallel computing, discussing theoretical issues such as the fundamentals of concurrent processes, models of parallel and distributed computing, and metrics for evaluating and comparing parallel algorithms, as well as practical issues, including methods of designing and implementing shared- and distributed-memory programs, and standards for parallel program implementation, in particular MPI and OpenMP interfaces. Each chapter presents the basics in one place followed by advanced topics, allowing novices and experienced practitioners to quickly find what they need. A glossary and more than 80 exercises with selected solutions aid comprehension. The book is recommended as a text for advanced undergraduate or graduate students and as a reference for practitioners.

Algorithms and Parallel Computing - Fayez Gebali 2011-03-29 There is a software gap between the hardware potential and the performance that can be attained using today's software parallel program development tools. The tools need manual intervention by the

programmer to parallelize the code. Programming a parallel computer requires closely studying the target algorithm or application, more so than in the traditional sequential programming we have all learned. The programmer must be aware of the communication and data dependencies of the algorithm or application. This book provides the techniques to explore the possible ways to program a parallel computer for a given application.

Parallel Computation - Peter Zinterhof 2003-05-21
This book constitutes the refereed proceedings of the 4th International Conference on Parallel Computation, ACPC'99, held in Salzburg, Austria in February 1999; the conference included special tracks on parallel numerics and on parallel computing in image processing, video processing, and multimedia. The volume presents 50 revised full papers selected from a total of 75 submissions. Also included are four invited papers and 15 posters. The papers are organized in topical sections on linear algebra, differential equations and interpolation, (Quasi-)Monte Carlo methods, numerical software, numerical applications, image segmentation and image understanding, motion estimation and block matching, video processing, wavelet techniques, satellite image processing, data structures, data partitioning, resource allocation and performance analysis, cluster computing, and simulation and applications.

Concise Encyclopedia of Software Engineering - Derrick Morris 2013-10-22
This Concise Encyclopedia of Software Engineering is intended to provide compact coverage of the knowledge relevant to the practicing software engineer. The content has been chosen to provide an introduction to the theory and techniques relevant to the software of a broad class of computer applications. It is supported by examples of particular applications and their enabling technologies. This Encyclopedia will be of value to new practitioners who need a concise overview and established practitioners who need to read about the "penumbra" surrounding their own specialities. It will also be useful to professionals from other disciplines who need to gain some understanding of the various aspects of software engineering which underpin complex information and control systems, and the thinking behind them.

Euro-Par 2002. Parallel Processing - Burkhard Monien 2003-08-02
Euro-Par – the European Conference on Parallel Computing – is an international conference series dedicated to the promotion and advancement of all aspects of parallel computing. The major themes can be divided into the broad categories of hardware, software, algorithms, and applications for parallel computing. The objective of Euro-Par is to provide a forum within which to promote the dev- opment of parallel computing both as an industrial technique and an academic discipline, extending the frontiers of both the state of the art and the state of the practice. This is particularlyimportant at a time when parallel computing is undergoing strong and sustained development and experiencing real industrial take-up. The main audience for and participants in Euro-Par are researchers in academic departments, government laboratories, and industrial organizations. Euro-Par aims to become the primarychoice of such professionals for the p- sentation of new results in their speci?c areas. Euro-Par is also interested in applications that demonstrate the e?ectiveness of the main Euro-Par themes. Euro-Par has its own Internet domain with a permanent website where the historyof the conference series is described: http://www. euro-par. org. The Euro-Par conference series is sponsored bythe Association of Computer - chineryand the International Federation of Information Processing. Euro-Par 2002 at Paderborn, Germany Euro-Par 2002 was organized bythe Paderborn Center for Parallel Comput- 2 2 ing (PC) and was held at the Heinz Nixdorf MuseumsForum (HNF).

Introduction to Parallel Computing - Roman Trobec 2018-09-27
Advancements in microprocessor architecture, interconnection technology, and software development have fueled rapid growth in parallel and distributed computing. However, this development is only of practical benefit if it is accompanied by progress in the design, analysis and programming of parallel algorithms. This concise textbook provides, in one place, three mainstream parallelization approaches, Open MPP,

MPI and OpenCL, for multicore computers, interconnected computers and graphical processing units. An overview of practical parallel computing and principles will enable the reader to design efficient parallel programs for solving various computational problems on state-of-the-art personal computers and computing clusters. Topics covered range from parallel algorithms, programming tools, OpenMP, MPI and OpenCL, followed by experimental measurements of parallel programs' run-times, and by engineering analysis of obtained results for improved parallel execution performances. Many examples and exercises support the exposition.

Solutions Manual for An Introduction to Genetic Analysis - David Scott 2010-12-24
Since its inception, Introduction to Genetic Analysis (IGA) has been known for its prominent authorship including leading scientists in their field who are great educators. This market best-seller exposes students to the landmark experiments in genetics, teaching students how to analyze experimental data and how to draw their own conclusions based on scientific thinking while teaching students how to think like geneticists. Visit the preview site at www.whfreeman.com/IGA10epreview

Parallel Processing and Applied Mathematics - Roman Wyrzykowski 2012-07-03
This two-volume-set (LNCS 7203 and 7204) constitutes the refereed proceedings of the 9th International Conference on Parallel Processing and Applied Mathematics, PPAM 2011, held in Torun, Poland, in September 2011. The 130 revised full papers presented in both volumes were carefully reviewed and selected from numerous submissions. The papers address issues such as parallel/distributed architectures and mobile computing; numerical algorithms and parallel numerics; parallel non-numerical algorithms; tools and environments for parallel/distributed/grid computing; applications of parallel/distributed computing; applied mathematics, neural networks and evolutionary computing; history of computing.
Handbook of Parallel Computing and Statistics - Erricos John

Kontoghiorghes 2005-12-21
Technological improvements continue to push back the frontier of processor speed in modern computers. Unfortunately, the computational intensity demanded by modern research problems grows even faster. Parallel computing has emerged as the most successful bridge to this computational gap, and many popular solutions have emerged based on its concepts
An Introduction to Parallel Programming - Peter Pacheco 2021-08-27
An Introduction to Parallel Programming, Second Edition presents a tried-and-true tutorial approach that shows students how to develop effective parallel programs with MPI, Pthreads and OpenMP. As the first undergraduate text to directly address compiling and running parallel programs on multi-core and cluster architecture, this second edition carries forward its clear explanations for designing, debugging and evaluating the performance of distributed and shared-memory programs while adding coverage of accelerators via new content on GPU programming and heterogeneous programming. New and improved user-friendly exercises teach students how to compile, run and modify example programs. Takes a tutorial approach, starting with small programming examples and building progressively to more challenging examples Explains how to develop parallel programs using MPI, Pthreads and OpenMP programming models A robust package of online ancillaries for instructors and students includes lecture slides, solutions manual, downloadable source code, and an image bank New to this edition: New chapters on GPU programming and heterogeneous programming New examples and exercises related to parallel algorithms
Parallel Scientific Computing and Optimization - Raimondas Ciegis 2008-10-08
Parallel Scientific Computing and Optimization introduces new developments in the construction, analysis, and implementation of parallel computing algorithms. This book presents 23 self-contained chapters, including survey chapters and surveys, written by distinguished researchers in the field of parallel computing. Each chapter is devoted to some aspects of the subject: parallel algorithms for

matrix computations, parallel optimization, management of parallel programming models and data, with the largest focus on parallel scientific computing in industrial applications. This volume is intended for scientists and graduate students specializing in computer science and applied mathematics who are engaged in parallel scientific computing.
Introduction to Parallel Algorithms - C. Xavier 1998-08-05 Parallel algorithms Made Easy The complexity of today's applications coupled with the widespread use of parallel computing has made the design and analysis of parallel algorithms topics of growing interest. This volume fills a need in the field for an introductory treatment of parallel algorithms-appropriate even at the undergraduate level, where no other textbooks on the subject exist. It features a systematic approach to the latest design techniques, providing analysis and implementation details for each parallel algorithm described in the book. Introduction to Parallel Algorithms covers foundations of parallel computing; parallel algorithms for trees and graphs; parallel algorithms for sorting, searching, and merging; and numerical algorithms. This remarkable book: * Presents basic concepts in clear and simple terms * Incorporates numerous examples to enhance students' understanding * Shows how to develop parallel algorithms for all classical problems in computer science, mathematics, and engineering * Employs extensive illustrations of new design techniques * Discusses parallel algorithms in the context of PRAM model * Includes end-of-chapter exercises and detailed references on parallel computing. This book enables universities to offer parallel algorithm courses at the senior undergraduate level in computer science and engineering. It is also an invaluable text/reference for graduate students, scientists, and engineers in computer science, mathematics, and engineering.
Parallel Computer Organization and Design - Michel Dubois 2012-08-30 Teaching fundamental design concepts and the challenges of emerging technology, this textbook prepares students for a career designing the computer systems of the future. In-depth coverage of complexity, power, reliability and performance, coupled with treatment of parallelism at all levels, including ILP and TLP, provides the state-of-the-art training that

students need. The whole gamut of parallel architecture design options is explained, from core microarchitecture to chip multiprocessors to large-scale multiprocessor systems. All the chapters are self-contained, yet concise enough that the material can be taught in a single semester, making it perfect for use in senior undergraduate and graduate computer architecture courses. The book is also teeming with practical examples to aid the learning process, showing concrete applications of definitions. With simple models and codes used throughout, all material is made open to a broad range of computer engineering/science students with only a basic knowledge of hardware and software.
Programming Massively Parallel Processors - David B. Kirk 2012-12-31
Programming Massively Parallel Processors: A Hands-on Approach, Second Edition, teaches students how to program massively parallel processors. It offers a detailed discussion of various techniques for constructing parallel programs. Case studies are used to demonstrate the development process, which begins with computational thinking and ends with effective and efficient parallel programs. This guide shows both student and professional alike the basic concepts of parallel programming and GPU architecture. Topics of performance, floating-point format, parallel patterns, and dynamic parallelism are covered in depth. This revised edition contains more parallel programming examples, commonly-used libraries such as Thrust, and explanations of the latest tools. It also provides new coverage of CUDA 5.0, improved performance, enhanced development tools, increased hardware support, and more; increased coverage of related technology, OpenCL and new material on algorithm patterns, GPU clusters, host programming, and data parallelism; and two new case studies (on MRI reconstruction and molecular visualization) that explore the latest applications of CUDA and GPUs for scientific research and high-performance computing. This book should be a valuable resource for advanced students, software engineers, programmers, and hardware engineers. New coverage of CUDA 5.0, improved performance, enhanced development tools, increased hardware support, and more Increased coverage of related technology,

OpenCL and new material on algorithm patterns, GPU clusters, host programming, and data parallelism Two new case studies (on MRI reconstruction and molecular visualization) explore the latest applications of CUDA and GPUs for scientific research and high-performance computing

Parallel Computing: Accelerating Computational Science and Engineering (CSE) - M. Bader 2014-03-31
Parallel computing has been the enabling technology of high-end machines for many years. Now, it has finally become the ubiquitous key to the efficient use of any kind of multi-processor computer architecture, from smart phones, tablets, embedded systems and cloud computing up to exascale computers. _x000D_ This book presents the proceedings of ParCo2013 – the latest edition of the biennial International Conference on Parallel Computing – held from 10 to 13 September 2013, in Garching, Germany. The conference focused on several key parallel computing areas. Themes included parallel programming models for multi- and manycore CPUs, GPUs, FPGAs and heterogeneous platforms, the performance engineering processes that must be adapted to efficiently use these new and innovative platforms, novel numerical algorithms and approaches to large-scale simulations of problems in science and engineering._x000D_ The conference programme also included twelve mini-symposia (including an industry session and a special PhD Symposium), which comprehensively represented and intensified the discussion of current hot topics in high performance and parallel computing. These special sessions covered large-scale supercomputing, novel challenges arising from parallel architectures (multi-/manycore, heterogeneous platforms, FPGAs), multi-level algorithms as well as multi-scale, multi-physics and multi-dimensional problems._x000D_ It is clear that parallel computing – including the processing of large data sets ("Big Data") – will remain a persistent driver of research in all fields of innovative computing, which makes this book relevant to all those with an interest in this field.
Introduction to Parallel Processing - Behrooz Parhami 2006-04-11
THE CONTEXT OF PARALLEL PROCESSING The field of digital computer architecture has grown explosively in the past two decades. Through a steady stream of experimental research, tool-building efforts, and theoretical studies, the design of an instruction-set architecture, once considered an art, has been transformed into one of the most quantitative branches of computer technology. At the same time, better understanding of various forms of concurrency, from standard pipelining to massive parallelism, and invention of architectural structures to support a reasonably efficient and user-friendly programming model for such systems, has allowed hardware performance to continue its exponential growth. This trend is expected to continue in the near future. This explosive growth, linked with the expectation that performance will continue its exponential rise with each new generation of hardware and that (in stark contrast to software) computer hardware will function correctly as soon as it comes off the assembly line, has its down side. It has led to unprecedented hardware complexity and almost intolerable dev- opment costs. The challenge facing current and future computer designers is to institute simplicity where we now have complexity; to use fundamental theories being developed in this area to gain performance and ease-of-use benefits from simpler circuits; to understand the interplay between technological capabilities and limitations, on the one hand, and design decisions based on user and application requirements on the other.

Applied Parallel Computing. Industrial Computation and Optimization - Jerzy Wasniewski 1996-12-11
Although the last decade has witnessed significant advances in control theory for finite and infinite dimensional systems, the stability and control of time-delay systems have not been fully investigated. Many problems exist in this field that are still unresolved, and there is a tendency for the numerical methods available either to be too general or too specific to be applied accurately across a range of problems. This monograph brings together the latest trends and new results in this field, with the aim of presenting methods covering a large range of techniques. Particular emphasis is placed on methods that can be directly applied to specific problems. The resulting book is one that will be of value to both

researchers and practitioners.

Parallel Programming - Bertil Schmidt 2017-11-20
Parallel Programming: Concepts and Practice provides an upper level introduction to parallel programming. In addition to covering general parallelism concepts, this text teaches practical programming skills for both shared memory and distributed memory architectures. The authors' open-source system for automated code evaluation provides easy access to parallel computing resources, making the book particularly suitable for classroom settings. Covers parallel programming approaches for single computer nodes and HPC clusters: OpenMP, multithreading, SIMD vectorization, MPI, UPC++ Contains numerous practical parallel programming exercises Includes access to an automated code evaluation tool that enables students the opportunity to program in a web browser and receive immediate feedback on the result validity of their program Features an example-based teaching of concept to enhance learning outcomes