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Applications to Scientific Computing

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Vladimir P. Gerdt, Wolfram Koepf, Ernst W. Mayr, Evgenii V. Vorozhtsov

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conference devoted to applications of computer al gebra in scientific computing The first conference in this sequence CASC 98 was held 20 24 April 1998 in St Petersburg Russia This volume contains revised versions of the papers submitted by the par ticipants and accepted by the program committee after a thorough reviewing process The collection of papers included in the proceedings covers various topics of computer algebra methods algorithms and software applied to scien tific computing symbolic numeric analysis and solving differential equations efficient computations with polynomials groups matrices and other related objects special purpose programming environments application to physics mechanics optics and to other areas In particular a significant group of papers deals with applications of computer algebra methods for the solution of current problems in group theory which mostly arise in mathematical physics **Computer Algebra in Scientific Computing** Vladimir P. Gerdt, Wolfram Koepf, Ernst W. Mayr, Evgenii V. Vorozhtsov, 2011-08-26 This book constitutes the refereed proceedings of the 13th International Workshop on Computer Algebra in Scientific Computing CASC 2011 held in Kassel Germany in September 2011 The 26 full papers included in the book were carefully reviewed and selected from numerous submissions The articles are organized in topical sections on the development of object oriented computer algebra software for the modeling of algebraic structures as typed objects matrix algorithms the investigation with the aid of computer algebra the development of symbolic numerical algorithms and the application of symbolic computations in applied problems of physics mechanics social science and engineering **Computer Algebra in Scientific Computing Matthew** England, Wolfram Koepf, Timur M. Sadykov, Werner M. Seiler, Evgenii V. Vorozhtsov, 2019-08-15 This book constitutes the refereed proceedings of the 21st International Workshop on Computer Algebra in Scientific Computing CASC 2019 held in Moscow Russia in August 2019 The 28 full papers presented together with 2 invited talks were carefully reviewed and selected from 44 submissions They deal with cutting edge research in all major disciplines of computer algebra The papers cover topics such as polynomial algebra symbolic and symbolic numerical computation applications of symbolic computation for investigating and solving ordinary differential equations applications of CASs in the investigation and solution of celestial mechanics problems and in mechanics physics and robotics Computer Algebra in Scientific Computing Vladimir P. Gerdt, 2009-08-28 This book constitutes the refereed proceedings of the 11th International Workshop on Computer Algebra in Scientific Computing CASC 2009 held in Kobe Japan in September 2009 The 28 revised full papers presented together with 2 invited lectures were carefully reviewed and selected from numerous submissions The topics addressed are all basic areas of scientific computing as they benefit from the application of computer algebra methods and software The papers cover computer algebra methods and algorithms application of symbolic and algebraic manipulation and CA methods and results for the numerical integration of the partial differential equations of the mathematical physics **Computer Algebra in** Scientific Computing Viktor G. Ganzha, Ernst Mayr, Evgenii Vasil'evich Vorozhtsov, 2000-09-27 Proceedings of the Third Workshop on Computer Algebra in Scientific Computing Samarkand Octobe5r 5 9 2000 Polynomial Algorithms in

Computer Algebra Franz Winkler, 2012-12-06 For several years now I have been teaching courses in computer algebra at the Universitat Linz the University of Delaware and the Universidad de Alcala de Henares In the summers of 1990 and 1992 I have organized and taught summer schools in computer algebra at the Universitat Linz Gradually a set of course notes has emerged from these activities People have asked me for copies of the course notes and different versions of them have been circulating for a few years Finally I decided that I should really take the time to write the material up in a coherent way and make a book out of it Here now is the result of this work Over the years many students have been helpful in improving the quality of the notes and also several colleagues at Linz and elsewhere have contributed to it I want to thank them all for their effort in particular I want to thank B Buchberger who taught me the theory of Grabner bases nearly two decades ago B F Caviness and B D Saunders who first stimulated my interest in various problems in computer algebra G E Collins who showed me how to compute in algebraic domains and J R Sendra with whom I started to apply computer algebra methods to problems in algebraic geometry Several colleagues have suggested improvements in earlier versions of this book However I want to make it clear that I am responsible for all remaining mistakes

Enabling Technologies for Computational Science Elias N. Houstis, John R. Rice, Efstratios Gallopoulos, Randall Bramley, 2012-12-06 Enabling Technologies for Computational Science assesses future application computing needs identifies research directions in problem solving environments PSEs addresses multi disciplinary environments operating on the Web proposes methodologies and software architectures for building adaptive and human centered PSEs and describes the role of symbolic computing in scientific and engineering PSEs The book also includes an extensive bibliography of over 400 references Enabling Technologies for Computational Science illustrates the extremely broad and interdisciplinary nature of the creation and application of PSEs Authors represent academia government laboratories and industry and come from eight distinct disciplines chemical engineering computer science ecology electrical engineering mathematics mechanical engineering psychology and wood sciences This breadth and diversity extends into the computer science aspects of PSEs These papers deal with topics such as artificial intelligence computer human interaction control data mining graphics language design and implementation networking numerical analysis performance evaluation and symbolic computing Enabling Technologies for Computational Science provides an assessment of the state of the art and a road map to the future in the area of problem solving environments for scientific computing This book is suitable as a reference for scientists from a variety of disciplines interested in using PSEs for their research SIAM Journal on Scientific and Statistical Computing Society for Industrial and Applied Mathematics, 1990 Computer Algebra in Scientific Computing Vladimir P. Gerdt, Wolfram Koepf, Ernst W. Mayr, Evgenii V. Vorozhtsov, 2013-08-15 This book constitutes the proceedings of the 14th International Workshop on Computer Algebra in Scientific Computing CASC 2013 held in Berlin Germany in September 2013 The 33 full papers presented were carefully reviewed and selected for inclusion in this book The papers address issues such as polynomial

algebra the solution of tropical linear systems and tropical polynomial systems the theory of matrices the use of computer algebra for the investigation of various mathematical and applied topics related to ordinary differential equations ODEs applications of symbolic computations for solving partial differential equations PDEs in mathematical physics problems arising at the application of computer algebra methods for finding infinitesimal symmetries applications of symbolic and symbolic numeric algorithms in mechanics and physics automatic differentiation the application of the CAS Mathematica for the simulation of quantum error correction in quantum computing the application of the CAS GAP for the enumeration of Schur rings over the group A5 constructive computation of zero separation bounds for arithmetic expressions the parallel implementation of fast Fourier transforms with the aid of the Spiral library generation system the use of object oriented languages such as Java or Scala for implementation of categories as type classes a survey of industrial applications of approximate computer algebra Computer Science and Scientific Computing James M. Ortega, 2014-05-10 Computer Science and Scientific Computing contains the proceedings of the Third ICASE Conference on Scientific Computing held in Williamsburg Virginia on April l and 2 1976 under the auspices of the Institute for Computer Applications in Systems Engineering at the NASA Langley Research Center The conference provided a forum for reviewing all the aspects of scientific computing and covered topics ranging from computer aided design CAD and computer science technology to the design of large hydrodynamics codes Case studies in reliable computing are also presented Comprised of 13 chapters this book begins with an introduction to the use of the hierarchical family concept in the development of scientific programming systems The discussion then turns to the data structures of scientific computing and their representation and management some important CAD capabilities required to support aerospace design in the areas of interactive support information management and computer hardware advances as well as some computer science developments which may contribute significantly to making such capabilities possible and the use of symbolic computation systems for problem solving in scientific research Subsequent chapters deal with computer applications in astrophysics the possibility of computing turbulence and numerical wind tunnels and the basis for a general purpose program for finite element analysis Software tools for computer graphics are also considered This monograph will be of value to scientists systems designers and engineers and students in computer science who have an interest in the subject of scientific computing **Optimization** Software Guide Jorge J. More, Stephen J. Wright, 1993-01-01 Mathematics of Computing Numerical Analysis Control of Nonholonomic Systems: from Sub-Riemannian Geometry to Motion Planning Frédéric Jean, 2014-07-17 Nonholonomic systems are control systems which depend linearly on the control Their underlying geometry is the sub Riemannian geometry which plays for these systems the same role as Euclidean geometry does for linear systems In particular the usual notions of approximations at the first order that are essential for control purposes have to be defined in terms of this geometry. The aim of these notes is to present these notions of approximation and their application to the motion planning problem for

nonholonomic systems Computational Science and Its Applications - ICCSA 2005 Osvaldo Gervasi, 2005-04-27 The four volume set LNCS 3480 3483 constitutes the refereed proceedings of the International Conference on Computational Science and Its Applications ICCSA 2005 held in Singapore in May 2005 The four volumes present a total of 540 papers selected from around 2700 submissions. The papers span the whole range of computational science comprising advanced applications in virtually all sciences making use of computational techniques as well as foundations techniques and methodologies from computer science and mathematics such as high performance computing and communication networking optimization information systems and technologies scientific visualization graphics image processing data analysis simulation and modelling software systems algorithms security multimedia etc **Encyclopedia of Computer Science and Technology** Allen Kent, James G. Williams, 2021-06-23 Volume 39 Supplement 24 Entity Identification to Virtual Reality in Driving Simulation Covering more than basic computer commands and procedures this encyclopaedia summarizes how technology has developed the future of computer programs and applications and the significance of computer components Following an introduction and overview there are approximately 750 to 800 entries Computer Algebra in Scientific Computing V.G. Ganzha, E.W. Mayr, E.V. Vorozhtsov, 2006-09-12 This book constitutes the refereed proceedings of the 9th International Workshop on Computer Algebra in Scientific Computing CASC 2006 The book presents 25 revised full papers together with 2 invited papers covering various expanding applications of computer algebra to scientific computing the computer algebra systems themselves and the CA algorithms Topics addressed are studies in Gr bner bases polynomial algebra homological algebra quantifier elimination celestial mechanics and more **Computer Algebra in Scientific Computing Viktor G.** Ganzha, Ernst W. Mayr, Evgenii V. Vorozhtsov, 2012-12-06 Proceedings of the Third Workshop on Computer Algebra in Scientific Computing Samarkand Octobe 5r 5 9 2000

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