Addison Wesley Longman Inc Calculus Answers

This book provides an introduction to combinatorics, finite calculus, formal series, recurrences, and approximations of sums. Readers will find not only coverage of the basic elements of the subjects but also deep insights into a range of less common topics rarely considered within a single book, such as counting with occupancy constraints, a clear distinction between algebraic and analytical properties of formal power series, an introduction to discrete dynamical systems with a thorough description of Sarkovskii's theorem, symbolic calculus, and a complete description of the Euler-Maclaurin formulas and their applications. Although several books touch on one or more of these aspects, precious few cover all of them. The authors, both pure mathematicians, have attempted to develop methods that will allow the student to formulate a given problem in a precise mathematical framework. The aim is to equip readers with a sound strategy for classifying and solving problems by pursuing a mathematically rigorous yet user-friendly approach. This is particularly useful in combinatorics, a field where, all too often, exercises are solved by means of ad hoc tricks. The book contains more than 400 examples and about 300 problems, and the reader will be able to find the proof of every result. To further assist students and teachers, important matters and comments are highlighted, and parts that can be omitted, at least during a first and

perhaps second reading, are identified.
This book constitutes the refereed proceedings of the First Asian Symposium on Programming Languages and Systems, APLAS 2003, held in Beijing, China in November 2003. The 24 revised full papers presented together with abstracts of 3 invited talks were carefully reviewed and selected from 75 submissions. The papers are devoted to concurrency and parallelism, language implementation and optimization, mobile computation and security, program analysis and verification, program transformation and calculation, programming paradigms and language design, programming techniques and applications, program semantics, categorical and logical foundations, tools and environments, type theory and type systems.
This book concisely presents a broad range of models and theories on social systems. Because of the huge spectrum of topics involving social systems, various issues related to Mathematics, Statistics, Teaching, Social Science, and Economics are discussed. In an effort to introduce the subject to a wider audience, this volume, part of the series "Studies in Systems, Decision and Control", equally addresses the needs of mathematicians, statisticians, sociologists and philosophers. The studies examined here are divided into four parts. The first part, "Perusing the Minds Behind Scientific Discoveries", traces the winding path of Syamal K. Sen and Ravi P. Agarwal's scholarship throughout history, and most importantly, the thought processes that allowed each of them to master their subject. The second part covers "Theories in Social

Systems" and the third discusses "Models in Social Systems", while the fourth and final part is dedicated to "Mathematical Methods in the Social Sciences". Given its breadth of coverage, the book will offer inquisitive readers a valuable point of departure for exploring these rich, vast, and ever-expanding fields of knowledge. Part of the International Series in Mathematics Mathematical Modeling for the Scientific Method is intended for the sophomore/junior-level student seeking to be well-grounded in mathematical modeling for their studies in biology, the physical sciences, engineering, and/or medicine. It clarifies the connection between deductive and inductive reasoning as used in Mathematics and Science and urges students to think critically about concepts and applications. The authors' goal is to be introductory in level while covering a broad range of techniques. They unite topics in statistics, linear algebra, calculus, and differential equations, while discussing how these subjects are interrelated and utilized. Mathematical Modeling for the Scientific Method leaves students with a clearer perspective of the role of mathematics within the sciences and the understanding of how to rationally work through even rigorous applications with ease.

This is an intermediate book for beginning postgraduate students and junior researchers, and offers up-to-date content on both continuum mechanics and elasticity. The material is self-contained and should provide readers sufficient working knowledge in both areas. Though the focus is primarily on vector and tensor calculus (the so-called coordinate-free approach), the more traditional

index notation is used whenever it is deemed more sensible. With the increasing demand for continuum modeling in such diverse areas as mathematical biology and geology, it is imperative to have various approaches to continuum mechanics and elasticity. This book presents these subjects from an applied mathematics perspective. In particular, it extensively uses linear algebra and vector calculus to develop the fundamentals of both subjects in a way that requires minimal use of coordinates (so that beginning graduate students and junior researchers come to appreciate the power of the tensor notation).

This book presents the proceedings of the International Conference on Cyber-Physical Systems and Control (CPS&C'2019), held in Peter the Great St. Petersburg Polytechnic University, which is celebrating its 120th anniversary in 2019. The CPS&C'2019 was dedicated to the 35th anniversary of the partnership between Peter the Great St. Petersburg Polytechnic University and Leibniz University of Hannover. Cyber-physical systems (CPSs) are a new generation of control systems and techniques that help promote prospective interdisciplinary research. A wide range of theories and methodologies are currently being investigated and developed in this area to tackle various complex and challenging problems. Accordingly, CPSs represent a scientific and engineering discipline that is set to make an impact on future systems of industrial and social scale that are characterized by the deep integration of real-time processing, sensing, and actuation into logical and physical heterogeneous domains. The CPS&C'2019

brought together researchers and practitioners from all over the world and to discuss cross-cutting fundamental scientific and engineering principles that underline the integration of cyber and physical elements across all application fields. The participants represented research institutions and universities from Austria, Belgium, Bulgaria, China, Finland, Germany, the Netherlands, Russia, Syria, Ukraine, the USA, and Vietnam. These proceedings include 75 papers arranged into five sections, namely keynote papers, fundamentals, applications, technologies, and education and social aspects.

Mathematics for Social Justice offers a collection of resources for mathematics faculty interested in incorporating questions of social justice into their classrooms. The book begins with a series of essays from instructors experienced in integrating social justice themes into their pedagogy; these essays contain political and pedagogical motivations as well as nuts-and-bolts teaching advice. The heart of the book is a collection of fourteen classroom-tested modules featuring ready-to-use activities and investigations for the college mathematics classroom. The mathematical tools and techniques used are relevant to a wide variety of courses including college algebra, math for the liberal arts, calculus, differential equations, discrete mathematics, geometry, financial mathematics, and combinatorics. The social justice themes include human trafficking, income inequality, environmental justice, gerrymandering, voting methods, and access to education. The volume editors are leaders of the national

movement to include social justice material into mathematics teaching. Gizem Karaali is Associate Professor of Mathematics at Pomona College. She is one of the founding editors of The Journal of Humanistic Mathematics, and an associate editor for The Mathematical Intelligencer and Numeracy ; she also serves on the editorial board of the MAA's Carus Mathematical Monographs. Lily Khadjavi is Associate Professor of Mathematics at Loyola Marymount University and is a past co-chair of the Infinite Possibilities Conference. She has served on the boards of Building Diversity in Science, the Barbara Jordan-Bayard Rustin Coalition, and the Harvard Gender and Sexuality Caucus.

The theory of optimal control systems has grown and flourished since the 1960's. Many texts, written on varying levels of sophistication, have been published on the subject. Yet even those purportedly designed for beginners in the field are often riddled with complex theorems, and many treatments fail to include topics that are essential to a thorough grounding in the various aspects of and approaches to optimal control. Optimal Control Systems provides a comprehensive but accessible treatment of the subject with just the right degree of mathematical rigor to be complete but practical. It provides a solid bridge between "traditional" optimization using the calculus of variations and what is called "modern" optimal control. It also treats both continuous-time and discrete-time optimal control systems, giving students a firm grasp on both methods. Among this book's most outstanding features is a

summary table that accompanies each topic or problem and includes a statement of the problem with a step-by-step solution. Students will also gain valuable experience in using industry-standard MATLAB and SIMULINK software, including the Control System and Symbolic Math Toolboxes. Diverse applications across fields from power engineering to medicine make a foundation in optimal control systems an essential part of an engineer's background. This clear, streamlined presentation is ideal for a graduate level course on control systems and as a quick reference for working engineers.

"Mr. Salov has taken one of my favorite creations – Perfect Profit – and provided an expanded description of his interpretation of it and put it in your hands with the included software. Like I said fifteen years ago, Perfect Profit is an important tool for the trading system developer. See for yourself." —Robert Pardo, President, Pardo Capital Limited "A very in-depth reference for programmers that should serve well into the future. The code herein lends itself well to other syntactically similar programming languages such as Java, PHP, and C#." —Ralph Vince The goal of trading is to make money, and for many, profits are the best way to measure that success. Author Valerii Salov knows how to calculate potential profit, and in Modeling Maximum Trading Profits with C++, he outlines an original and thought-provoking approach to trading that will help you do the same. This detailed guide will show you how to effectively

calculate the potential profit in a market under conditions of variable transaction costs, and provide you with the tools needed to compute those values from real prices. You'll be introduced to new notions of s-function, s-matrix, s-interval, and polarities of s-intervals, and discover how they can be used to build the r- and l-algorithms as well as the first and second profit and loss reserve algorithms. Optimal money management techniques are also illustrated throughout the book, so you can make the most informed trading decisions possible. Filled with in-depth insight and expert advice, Modeling Maximum Trading Profits with C++ contains a comprehensive overview of trading, money management, and C++. A companion website is also included to help you test the concepts described throughout the book before you attempt to use them in real-world situations.

This book provides a basic, initial resource, introducing science and engineering students to the field of optimization. It covers three main areas: mathematical programming, calculus of variations and optimal control, highlighting the ideas and concepts and offering insights into the importance of optimality conditions in each area. It also systematically presents affordable approximation methods. Exercises at various levels have been included to support the learning process.

How can computer modeling and simulation tools be

used to understand and analyze common situations and everyday problems? Readers will find here an easy-to-follow, enjoyable introduction for anyone even with little background training. Examples are incorporated throughout to stimulate interest and engage the reader. Build the necessary skillsets with operating systems, editing, languages, commands, and visualization. Obtain hands-on examples from sports, accidents, and disease to problems of heat transfer, fluid flow, waves, and groundwater flow. Includes discussion of parallel computing and graphics processing units. This introductory, practical guide is suitable for students at any level up to professionals looking to use modeling and simulation to help solve basic to more advanced problems. Michael W. Roth, PhD, serves as Dean of the School of STEM and Business at Hawkeye Community College in Waterloo, Iowa. He was most recently Chair for three years at Northern Kentucky University's Department of Physics, Geology and Engineering Technology, and holds several awards for teaching excellence.

This open access textbook takes the reader step-by-step through the concepts of mechanics in a clear and detailed manner. Mechanics is considered to be the core of physics, where a deep understanding of the concepts is essential in understanding all branches of physics. Many proofs and examples are included to help the reader grasp the fundamentals

fully, paving the way to deal with more advanced topics. After solving all of the examples, the reader will have gained a solid foundation in mechanics and the skills to apply the concepts in a variety of situations. The book is useful for undergraduate students majoring in physics and other science and engineering disciplines. It can also be used as a reference for more advanced levels.

This expanded second edition presents the fundamentals and touchstone results of real analysis in full rigor, but in a style that requires little prior familiarity with proofs or mathematical language. The text is a comprehensive and largely self-contained introduction to the theory of real-valued functions of a real variable. The chapters on Lebesgue measure and integral have been rewritten entirely and greatly improved. They now contain Lebesgue's differentiation theorem as well as his versions of the Fundamental Theorem(s) of Calculus. With expanded chapters, additional problems, and an expansive solutions manual, Basic Real Analysis, Second Edition is ideal for senior undergraduates and first-year graduate students, both as a classroom text and a self-study guide. Reviews of first edition: The book is a clear and well-structured introduction to real analysis aimed at senior undergraduate and beginning graduate students. The prerequisites are few, but a certain mathematical sophistication is required. ... The text

contains carefully worked out examples which contribute motivating and helping to understand the theory. There is also an excellent selection of exercises within the text and problem sections at the end of each chapter. In fact, this textbook can serve as a source of examples and exercises in real analysis. —Zentralblatt MATH The quality of the exposition is good: strong and complete versions of theorems are preferred, and the material is organised so that all the proofs are of easily manageable length; motivational comments are helpful, and there are plenty of illustrative examples. The reader is strongly encouraged to learn by doing: exercises are sprinkled liberally throughout the text and each chapter ends with a set of problems, about 650 in all, some of which are of considerable intrinsic interest. —Mathematical Reviews [This text] introduces upper-division undergraduate or first-year graduate students to real analysis.... Problems and exercises abound; an appendix constructs the reals as the Cauchy (sequential) completion of the rationals; references are copious and judiciously chosen; and a detailed index brings up the rear. —CHOICE Reviews

Appendicies A to I that are referenced by Volumes I and II in the theory of quantum torus knots (QTK). A detailed mathematical derivation of space curves is provided that links the diverse fields of superfluids, quantum mechanics, and hydrodynamics.

The textbook, Introduction to Wavelet Transforms provides basics of wavelet transforms in a self-contained manner. Applications of wavelet transform theory permeate our daily lives. Therefore it is imperative to have a strong foundation for this subject. Features No prior knowledge of the subject is assumed. Sufficient mathematical background is provided to complete the discussion of different topics. Different topics have been properly segmented for easy learning. This makes the textbook pedagogical and unique. Notation is generally introduced in the definitions. Relatively easy consequences of the definitions are listed as observations, and important results are stated as theorems. Examples are provided for clarity and to enhance reader's understanding of the subject. Each chapter also has a problem section. A majority of the problems are provided with sufficient hints. The textbook can be used either in an upper-level undergraduate or first-year graduate class in electrical engineering, or computer science, or applied mathematics. It can also be used by professionals and researchers in the field who would like a quick review of the basics of the subject. About the Author Nirdosh Bhatnagar works in both academia and industry in Silicon Valley, California. He is also the author of a comprehensive two-volume work: Mathematical Principles of the Internet, published by the CRC Press in the year 2019.

Nirdosh earned M.S. in Operations Research, and M.S. and Ph.D. in electrical engineering, all from Stanford University, Stanford, California.

This book constitutes the thoroughly refereed post-proceedings of the First International Symposium on Unifying Theories of Programming, UTP 2006, held at Walworth Castle, County Durham, UK, in February 2006. The 14 revised full papers presented, including those by the six invited speakers, were carefully reviewed and selected for presentation at the symposium and went through a second round of improvement after the meeting. Based on the pioneering work on unifying theories of programming by Tony Haare and Jifeng He, UTP 2006 reaffirmed the relevance of the ongoing UTP project and advanced it by focusing on the most significant results and by raising awareness of the benefits of unifying theoretical frameworks among the wider computer science and software engineering communities.

Super-Intelligent Machines combines neuroscience and computer science to analyze future intelligent machines. It describes how they will mimic the learning structures of human brains to serve billions of people via the network, and the superior level of consciousness this will give them. Whereas human learning is reinforced by self-interests, this book describes the selfless and compassionate values that must drive machine learning in order to protect human society. Technology will change life much more in the twenty-first century than it has in the twentieth, and Super-Intelligent

Machines explains how that can be an advantage.

This Research Note presents some recent advances in various important domains of partial differential equations and applied mathematics, in particular for calculus of variations and fluid flows. These topics are now part of various areas of science and have experienced tremendous development during the last decades.

Stochastic differential equations (SDEs) are a powerful tool in science, mathematics, economics and finance. This book will help the reader to master the basic theory and learn some applications of SDEs. In particular, the reader will be provided with the backward SDE technique for use in research when considering financial problems in the market, and with the reflecting SDE technique to enable study of optimal stochastic population control problems. These two techniques are powerful and efficient, and can also be applied to research in many other problems in nature, science and elsewhere.

This book is a tribute to Professor Ewa Or?owska, a Polish logician who was celebrating the 60th year of her scientific career in 2017. It offers a collection of contributed papers by different authors and covers the most important areas of her research. Prof. Or?owska made significant contributions to many fields of logic, such as proof theory, algebraic methods in logic and knowledge representation, and her work has been published in 3 monographs and over 100 articles in internationally acclaimed journals and conference proceedings. The book also includes Prof. Or?owska's autobiography, bibliography and a trialogue between her and the editors of the volume, as well as contributors' biographical notes, and is suitable for scholars and students of logic who are interested in understanding more about Prof. Or?owska's work.

Calculus Explorer Tutor 1 and 2Addison-Wesley

This five-volume set clearly manifests the great significance of these key technologies for the new economies of the new millennium. The discussions provide a wealth of practical ideas intended to foster innovation in thought and, consequently, in the further development of technology. Together, they comprise a significant and uniquely comprehensive reference source for research workers, practitioners, computer scientists, academics, students, and others on the international scene for years to come.

This book constitutes the proceedings of the Workshops held in conjunction with SAFECOMP 2021, the 40th International Conference on Computer Safety, Reliability and Security, which took place in York, UK, in September 2021. The 26 regular papers included in this volume were carefully reviewed and selected from 34 submissions. The workshops included in this volume are: DECSoS 2021: 16th Workshop on Dependable Smart Embedded and Cyber-Physical Systems and Systems-of-Systems WAISE 2021: Fourth International Workshop on Artificial Intelligence Safety Engineering DepDevOps 2021: Second International Workshop on Dependable Development-Operation Continuum Methods for Dependable Cyber-Physical Systems USDAI 2021: Second International Workshop on Underpinnings for Safe Distributed AI MAPSOD 2021: First International Workshop on Multi-concern Assurance Practices in Software Design

Intended for students who have a firm background in introductory algebra, this text is appropriate for a one-term course in intermediate algebra. Intermediate Algebra, Sixth Edition, provides the necessary preparation for any introductory college-level mathematics course, including courses in college algebra, precalculus, finite mathematics, or brief calculus.

Applied Engineering Analysis Tai-Ran Hsu, San Jose State University, USA A resource book applying mathematics to solve engineering problems Applied Engineering Analysis is a concise textbookwhich demonstrates how toapply mathematics to solve engineering problems. It begins with an overview of engineering analysis and an introduction to mathematical modeling, followed by vector calculus, matrices and linear algebra, and applications of first and second order differential equations. Fourier series and Laplace transform are also covered, along with partial differential equations, numerical solutions to nonlinear and differential equations and an introduction to finite element analysis. The book also covers statistics with applications to design and statistical process controls. Drawing on the author's extensive industry and teaching experience, spanning 40 years, the book takes a pedagogical approach and includes examples, case studies and end of chapter problems. It is also accompanied by a website hosting a solutions manual and PowerPoint slides for instructors. Key features: Strong emphasis on deriving equations, not just solving given equations, for the solution of engineering problems. Examples and problems of a practical nature with illustrations to enhance student's self-learning. Numerical methods and techniques, including finite element analysis. Includes coverage of statistical methods for

probabilistic design analysis of structures and
statistical process control (SPC). Applied
Engineering Analysis is a resource book for
engineering students and professionals to learn how
to apply the mathematics experience and skills that
they have already acquired to their engineering
profession for innovation, problem solving, and
decision making.

This monograph introduces a novel and effective
approach to counting lattice paths by using the
discrete Fourier transform (DFT) as a type of
periodic generating function. Utilizing a previously
unexplored connection between combinatorics and
Fourier analysis, this method will allow readers to
move to higher-dimensional lattice path problems
with ease. The technique is carefully developed in
the first three chapters using the algebraic properties
of the DFT, moving from one-dimensional problems
to higher dimensions. In the following chapter, the
discussion turns to geometric properties of the DFT
in order to study the corridor state space. Each
chapter poses open-ended questions and exercises
to prompt further practice and future research. Two
appendices are also provided, which cover complex
variables and non-rectangular lattices, thus ensuring
the text will be self-contained and serve as a valued
reference. Counting Lattice Paths Using Fourier
Methods is ideal for upper-undergraduates and
graduate students studying combinatorics or other

areas of mathematics, as well as computer science or physics. Instructors will also find this a valuable resource for use in their seminars. Readers should have a firm understanding of calculus, including integration, sequences, and series, as well as a familiarity with proofs and elementary linear algebra. This book constitutes the refereed proceedings of the 14th International Colloquium on Theoretical Aspects of Computing, ICTAC 2017, held in Hanoi, Vietnam, in October 2017. The 17 revised full papers presented together with three invited talks were carefully reviewed and selected from 40 submissions. The papers are organized in topical sections on logics; software components and concurrency; automata; SMT solvers and algorithms; and security.

This book constitutes the refereed proceedings of the 20th European Conference on Object-Oriented Programming, ECOOP 2006, held in Nantes, France in July 2006. 20 revised full papers, together with 3 keynote papers were carefully reviewed and selected. The papers are organized in topical sections on program query and persistence, ownership and concurrency, languages, type theory, types for object-oriented languages, tools, and modularity. 5 more papers celebrate the 20th anniversary of ECOOP.

This book constitutes the refereed proceedings of the 21st European Conference on Object-Oriented

Programming, ECOOP 2007, held in Berlin, Germany in July/August 2007. The 25 revised full papers, presented together with 3 invited talks were carefully reviewed and selected from a total of 135 final submissions. The papers are organized in topical sections on types, runtime implementation, empirical studies, programs and predicates, language design, inheritance and derivation, aspects, as well as language about language. The emphasis of this book lies in the teaching of mathematical modeling rather than simply presenting models. To this end the book starts with the simple discrete exponential growth model as a building block, and successively refines it. This involves adding variable growth rates, multiple variables, fitting growth rates to data, including random elements, testing exactness of fit, using computer simulations and moving to a continuous setting. No advanced knowledge is assumed of the reader, making this book suitable for elementary modeling courses. The book can also be used to supplement courses in linear algebra, differential equations, probability theory and statistics. Basic Insights in Vector Calculus provides an introduction to three famous theorems of vector calculus, Green's theorem, Stokes' theorem and the divergence theorem (also known as Gauss's theorem). Material is presented so that results emerge in a natural way. As in classical physics, we

begin with descriptions of flows.The book will be helpful for undergraduates in Science, Technology, Engineering and Mathematics, in programs that require vector calculus. At the same time, it also provides some of the mathematical background essential for more advanced contexts which include, for instance, the physics and engineering of continuous media and fields, axiomatically rigorous vector analysis, and the mathematical theory of differential forms.There is a Supplement on mathematical understanding. The approach invites one to advert to one's own experience in mathematics and, that way, identify elements of understanding that emerge in all levels of learning and teaching.Prerequisites are competence in single-variable calculus. Some familiarity with partial derivatives and the multi-variable chain rule would be helpful. But for the convenience of the reader we review essentials of single- and multi-variable calculus needed for the three main theorems of vector calculus.Carefully developed Problems and Exercises are included, for many of which guidance or hints are provided.

Shelving Guide: Electrical Engineering Since the 1980s more than 100 books on the finite element method have been published, making this numerical method the most popular. The features of the finite element method gained worldwide popularity due to its flexibility for simulating not only any kind of

physical phenomenon described by a set of differential equations, but also for the possibility of simulating non-linearity and time-dependent studies. Although a number of high-quality books cover all subjects in engineering problems, none of them seem to make this method simpler and easier to understand. This book was written with the goal of simplifying the mathematics of the finite element method for electromagnetic students and professionals relying on the finite element method for solving design problems. Filling a gap in existing literature that often uses complex mathematical formulas, Electromagnetics through the Finite Element Method presents a new mathematical approach based on only direct integration of Maxwell's equation. This book makes an original, scholarly contribution to our current understanding of this important numerical method.

Innovation, agility, and coordination are paramount in the support of value in the global knowledge economy. Therefore, the long-term success of a company is increasingly dependent on its underlying resilience and agility. Knowledge Reuse and Agile Processes: Catalysts for Innovation addresses flexibility of both business and information systems through component technology at the nexus of three seemingly unrelated disciplines: service-oriented architecture, knowledge management, and business process management. Providing practitioners and academians with timely, compelling research on agile, adaptive processes and information systems, this Premier Reference Source will enhance the collection of every reference library.

Designed to allow students to explore several calculus topics using function and three-dimensional graphers, a vector calculator, and programs for roots, integration, and differential equations.

The year's finest writing on mathematics from around the world This annual anthology brings together the year's finest mathematics writing from around the world. Featuring promising new voices alongside some of the foremost names in the field, The Best Writing on Mathematics 2014 makes available to a wide audience many articles not easily found anywhere else—and you don't need to be a mathematician to enjoy them. These writings offer surprising insights into the nature, meaning, and practice of mathematics today. They delve into the history, philosophy, teaching, and everyday occurrences of math, and take readers behind the scenes of today's hottest mathematical debates. Here John Conway presents examples of arithmetical statements that are almost certainly true but likely unprovable; Carlo Séquin explores, compares, and illustrates distinct types of one-sided surfaces known as Klein bottles; Keith Devlin asks what makes a video game good for learning mathematics and shows why many games fall short of that goal; Jordan Ellenberg reports on a recent breakthrough in the study of prime numbers; Stephen Pollard argues that mathematical practice, thinking, and experience transcend the utilitarian value of mathematics; and much, much more. In addition to presenting the year's most memorable writings on mathematics, this must-have anthology includes an introduction by editor Mircea Pitici. This book belongs on the shelf of anyone interested in where math has taken us—and where it is headed.

With warm-hearted and friendly promotion by our Japanese friends Prof. - sushi Ohori, Prof. Tetsuo Ida, and Prof. Zhenjiang Hu, and other distinguished professors and scholars from countries and regions such as Japan, South

Korea, Singapore, and Taiwan, the 1st Asian Symposium on Programming Languages andSystems(APLAS2003)tookplace inBeijing.Wereceived76papers,among which 24 were selected for the proceedings after serious evaluation, which fully demonstrates the high quality of the collected papers. I hereby, on behalf of the Program Committee and the Organization Committee of the symposium, would like to extend the warmest welcome and hearty thanks to all colleagues who attended the symposium, all scholars who generously contributed their papers, and all those who were actively dedicated to the organization of this symposium. Over the past decade, the Asian economy has undergone rapid development. Keeping pace with this accelerated economic growth, Asia has made great he- way in software, integrated circuits, mobile communication and the Internet. All this has laid a ?rm material foundation for undertaking theoretical research on computer science and programming languages. Therefore, to meet the incr- sing demands of the IT market, great opportunities and challenges in advanced research in these ?elds. I strongly believe that in the coming future, with the persistent e?orts of our colleagues, the Asian software industry and research on computer science will be important players in the world economy, on an equal footing with their counterparts in the United States and Europe.