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Computational Science and Its Applications - ICCSA 2006 - Osvaldo Gervasi 2006-05-11
The five-volume set LNCS 3980-3984 constitutes the refereed proceedings of the International Conference on Computational Science and Its Applications, ICCSA 2006. The volumes present a total of 664 papers organized according to the five major conference themes: computational methods, algorithms and applications high performance technical computing and networks advanced and emerging applications geometric modelling, graphics and visualization information systems and information technologies. This is Part I.

Mathematical Analysis and Computing - R. N. Mohapatra 2021-05-05
This book is a collection of selected papers presented at the International Conference on Mathematical Analysis and Computing (ICMAC 2019) held at Sri Sivasubramaniya Nadar College of Engineering, Chennai, India, from 23–24 December 2019. Having found its applications in game theory, economics, and operations research, mathematical analysis plays an important role in analyzing models of physical systems and provides a sound logical base for problems stated in a qualitative manner. This book aims at disseminating recent advances in areas of mathematical analysis, soft computing, approximation and optimization through original research articles and expository survey papers. This book will be of value to research scholars, professors, and industrialists working in these areas.

Finite Difference Methods,Theory and Applications - Ivan Dimov 2015-06-16
This book constitutes the thoroughly refereed post-conference proceedings of the 6th International Conference on Finite Difference Methods, FDM 2014, held in Lozenetz, Bulgaria, in June 2014. The 36 revised full papers were carefully reviewed and selected from 62 submissions. These papers together with 12 invited papers cover topics such as finite difference and combined finite difference methods as well as finite element methods and their various applications in physics, chemistry, biology and finance.

Recent Advances in Applied Mathematics and Applications to the Dynamics of Fluid Flows - Suripeddi Srinivas 2022-10-15
This book presents select proceedings of the 5th International Conference on Applications of Fluid Dynamics (ICAFD 2020) organized by the School of Mechanical Engineering Science, VIT-AP University, India, in association with the University of Johannesburg, Auckland Park Kingsway Campus, South Africa. It identifies the existing challenges in the area of applied mathematics and mechanics (of solids and fluids) and emphasizes the importance of establishing new methods and algorithms to address these challenges. The topics covered include diverse applications of fluid dynamics in aerospace dynamics and propulsion, atmospheric sciences, compressible flow, environmental fluid dynamics, control structures, viscoelasticity and mechanics of composites. Given the contents, the book will be a useful resource for researchers as well as practitioners working in the area of mechanical engineering and applied mathematics.

Numerical Methods and Applications - Lirkov Ivan Dimov 2011-01-27
This book constitutes the thoroughly refereed post-conference proceedings of the 7th International Conference on Numerical Methods and Applications, NMA 2010, held in Borovets, Bulgaria, in August

2010. The 60 revised full papers presented together with 3 invited papers were carefully reviewed and selected from numerous submissions for inclusion in this book. The papers are organized in topical sections on Monte Carlo and quasi-Monte Carlo methods, environmental modeling, grid computing and applications, metaheuristics for optimization problems, and modeling and simulation of electrochemical processes.
Computational Mechanics - Zhenhan Yao 2004

BAIL 2010 - Boundary and Interior Layers, Computational and Asymptotic Methods - Carmelo Clavero 2011-05-11
This volume will contain selected papers from the lectures held at the BAIL 2010 Conference, which took place from July 5th to 9th, 2010 in Zaragoza (Spain). The papers present significant advances in the modeling, analysis and construction of efficient numerical methods to solve boundary and interior layers appearing in singular perturbation problems. Special emphasis is put on the mathematical foundations of such methods and their application to physical models. Topics in scientific fields such as fluid dynamics, quantum mechanics, semiconductor modeling, control theory, elasticity, chemical reactor theory, and porous media are examined in detail.
Introduction to Singular Perturbations - Robert E. Jr. O'Malley 2012-12-02
Introduction to Singular Perturbations provides an overview of the fundamental techniques for obtaining asymptomatic solutions to boundary value problems. This text explores singular perturbation techniques, which are among the basic tools of several applied scientists. This book is organized into eight chapters, wherein Chapter 1 discusses the method of matched asymptomatic expansions, which has been frequently applied to several physical problems involving singular perturbations. Chapter 2 considers the nonlinear initial value problem to illustrate the regular perturbation method, and Chapter 3 explains how to construct asymptotic solutions for general linear equations. Chapter 4 discusses scalar equations and nonlinear system, whereas Chapters 5 and 6 explain the contrasts for initial value problems where the outer expansion cannot be determined without obtaining the initial values of the boundary layer correction. Chapters 7 and 8 deal with boundary value problem that arises in the study of adiabatic tubular chemical flow reactors with axial diffusion. This monograph is a valuable resource for applied mathematicians, engineers, researchers, students, and readers whose interests span a variety of fields.
Numerical Analysis and Its Applications - Zhilin Li 2005-02-07
This book constitutes the thoroughly refereed post-proceedings of the Third International Conference on Numerical Analysis and Its Applications, NAA 2004, held in Rousse, Bulgaria in June/July 2004. The 68 revised full papers presented together with 8 invited papers were carefully selected during two rounds of reviewing and improvement. All current aspects of numerical analysis are addressed. Among the application fields covered are computational sciences and engineering, chemistry, physics, economics, simulation, fluid dynamics, visualization, etc.
Uniform Numerical Methods for Problems with Initial and Boundary Layers - E. P. Doolan 1980

High Performance Computing - HiPC 2006 - Yves L. Robert 2006-11-27
This book constitutes the refereed proceedings of the 13th International Conference on High-Performance Computing, HiPC 2006, held in Bangalore, India in December 2006. The 52 revised full papers presented together with the abstracts of 7 invited talks were carefully reviewed and selected from 335 submissions. The papers are organized in topical sections on scheduling and load balancing, architectures, network and distributed algorithms, application software, network services, applications, ad-hoc networks, systems software, sensor networks and performance evaluation, as well as routing and data management algorithms.

Applied Mathematics and Scientific Computing - B. Rushi Kumar 2019-02-01
This volume is the first of two containing selected papers from the International Conference on Advances in Mathematical Sciences (ICAMS), held at the Vellore Institute of Technology in December 2017. This meeting brought together researchers from around the world to share their work, with the aim of promoting collaboration as a means of solving various problems in modern science and engineering. The authors of each chapter present a research problem, techniques suitable for solving it, and a discussion of the results obtained. These volumes will be of interest to both theoretical- and application-oriented individuals in academia and industry. Papers in Volume I are dedicated to active and open areas of research in algebra, analysis, operations research, and statistics, and those of Volume II consider differential equations, fluid mechanics, and graph theory.

Industrial Mathematics - Mohan C. Joshi 2006
This monograph contains results of recent research interests concerning solution strategies employed for solving real life problems pertaining to modelling and scientific computing, control and optimizations, and financial mathematics.

Analytical and Numerical Methods for Convection-dominated and Singularly Perturbed Problems - Lubin Vulkov 2000
This volume is the Proceedings of the Workshop on Analytical and Computational Methods for Convection-Dominated and Singularly Perturbed Problems, which took place in Lozenetz, Bulgaria, 27-31 August 1998. The workshop attracted about 50 participants from 12 countries. The volume includes 13 invited lectures and 19 contributed papers presented at the workshop and thus gives an overview of the latest developments in both the theory and applications of advanced numerical methods to problems having boundary and interior layers. There was an emphasis on experiences from the numerical analysis of such problems and on theoretical developments. The aim of the workshop was to provide an opportunity for scientists from the East and the West, who develop robust methods for singularly perturbed and related problems and also who apply these methods to real-life problems, to discuss recent achievements in this area and to exchange ideas with a view of possible research co-operation.

Differential Equations and Applications - Valarmathi Sigamani 2022-02-25
This book collects select papers presented at the International Conference on Applications of Basic Sciences, held at Tiruchirappalli, Tamil Nadu, India, from 19-21 November 2019. The book discusses topics on singular perturbation problems, differential equations, numerical analysis, fuzzy logics, fuzzy differential equations, and mathematical physics, and their interdisciplinary applications in all areas of basic sciences: mathematics, physics, chemistry, and biology. It will be useful to researchers and scientists in all disciplines of basic sciences. This book will be very useful to know the different scientific approaches for a single physical system.

Fitted Numerical Methods for Singular Perturbation Problems - J. J. H. Miller 2012
Since the first edition of this book, the literature on fitted mesh methods for singularly perturbed problems has expanded significantly. Over the intervening years, fitted meshes have been shown to be effective for an extensive set of singularly perturbed partial differential equations. In the revised version of this book, the reader will find an introduction to the basic theory associated with fitted numerical methods for singularly perturbed differential equations. Fitted mesh methods focus on the appropriate distribution of the mesh points for singularly perturbed problems. The global errors in the numerical approximations are measured in the pointwise maximum norm. The fitted mesh algorithm is particularly simple to implement in practice, but the theory of why these numerical methods work is far from simple. This book can be used as

an introductory text to the theory underpinning fitted mesh methods.

Layer Resolving Grids and Transformations for Singular Perturbation Problems - Vladimir D. Liseikin 2018-11-05
The approach of layer-damping coordinate transformations to treat singularly perturbed equations is a relatively new, and fast growing area in the field of applied mathematics. This monograph aims to present a clear, concise, and easily understandable description of the qualitative properties of solutions to singularly perturbed problems as well as of the essential elements, methods and codes of the technology adjusted to numerical solutions of equations with singularities by applying layer-damping coordinate transformations and corresponding layer-resolving grids. The first part of the book deals with an analytical study of estimates of the solutions and their derivatives in layers of singularities as well as suitable techniques for obtaining results. In the second part, a technique for building the coordinate transformations eliminating boundary and interior layers, is presented. Numerical algorithms based on the technique which is developed for generating layer-damping coordinate transformations and their corresponding layer-resolving meshes are presented in the final part of this volume. This book will be of value and interest to researchers in computational and applied mathematics.

Differential Equations and Numerical Analysis - Valarmathi Sigamani 2016-08-17
This book offers an ideal introduction to singular perturbation problems, and a valuable guide for researchers in the field of differential equations. It also includes chapters on new contributions to both fields: differential equations and singular perturbation problems. Written by experts who are active researchers in the related fields, the book serves as a comprehensive source of information on the underlying ideas in the construction of numerical methods to address different classes of problems with solutions of different behaviors, which will ultimately help researchers to design and assess numerical methods for solving new problems. All the chapters presented in the volume are complemented by illustrations in the form of tables and graphs.

Computational Science - Iccs 2005 - V.S. Sunderam 2005-05-12
The three-volume set LNCS 3514-3516 constitutes the refereed proceedings of the 5th International Conference on Computational Science, ICCS 2005, held in Atlanta, GA, USA in May 2005.The 464 papers presented were carefully reviewed and selected from a total of 834 submissions for the main conference and its 21 topical workshops. The papers span the whole range of computational science, ranging from numerical methods, algorithms, and computational kernels to programming environments, grids, networking, and tools. These fundamental contributions dealing with computer science methodologies and techniques are complemented by papers discussing computational applications and needs in virtually all scientific disciplines applying advanced computational methods and tools to achieve new discoveries with greater accuracy and speed.

Layer-Adapted Meshes for Reaction-Convection-Diffusion Problems - Torsten Linß 2009-11-21
This is a book on numerical methods for singular perturbation problems – in part- ular, stationary reaction-convection-diffusion problems exhibiting layer behaviour. More precisely, it is devoted to the construction and analysis of layer-adapted meshes underlying these numerical methods. Numerical methods for singularly perturbed differential equations have been studied since the early 1970s and the research frontier has been constantly - panding since. A comprehensive exposition of the state of the art in the analysis of numerical methods for singular perturbation problems is [141] which was p- lished in 2008. As that monograph covers a big variety of numerical methods, it only contains a rather short introduction to layer-adapted meshes, while the present book is exclusively dedicated to that subject. An early important contribution towards the optimisation of numerical methods by means of special meshes was made by N.S. Bakhvalov [18] in 1969. His paper spawned a lively discussion in the literature with a number of further meshes - ing proposed and applied to various singular perturbation problems. However, in the mid 1980s, this development stalled, but was enlivened again by G.I. Shishkin's proposal of piecewise-equidistant meshes in the early 1990s [121,150]. Because of their very simple structure, they are often much easier to analyse than other meshes, although they give numerical approximations that are inferior to solutions on c- peting meshes. Shishkin meshes for numerous problems and numerical methods have been studied since and they are still very much in vogue.

Difference Methods for Singular Perturbation Problems - Grigory I. Shishkin 2008-09-22
Difference Methods for Singular Perturbation Problems focuses on the development of robust difference schemes for wide classes of boundary value problems. It justifies the ε-uniform convergence of these schemes and surveys the latest approaches important for further progress in numerical methods. The first part of the book explores boundary value problems for elliptic and parabolic reaction-diffusion and convection-diffusion equations in n-dimensional domains with smooth and piecewise-smooth boundaries. The authors develop a technique for constructing and justifying ε uniformly convergent difference schemes for boundary value problems with fewer restrictions on the problem data. Containing information published mainly in the last four years, the second section focuses on problems with boundary layers and additional singularities generated by nonsmooth data, unboundedness of the domain, and the perturbation vector parameter. This part also studies both the solution and its derivatives with errors that are independent of the perturbation parameters. Co-authored by the creator of the Shishkin mesh, this book presents a systematic, detailed development of approaches to construct ε uniformly convergent finite difference schemes for broad classes of singularly perturbed boundary value problems.

Convection-Diffusion Problems: An Introduction to Their Analysis and Numerical Solution - Martin Stynes 2018-11-21
Many physical problems involve diffusive and convective (transport) processes. When diffusion dominates convection, standard numerical methods work satisfactorily. But when convection dominates diffusion, the standard methods become unstable, and special techniques are needed to compute accurate numerical approximations of the unknown solution. This convection-dominated regime is the focus of the book. After discussing at length the nature of solutions to convection-dominated convection-diffusion problems, the authors motivate and design numerical methods that are particularly suited to this class of problems. At first they examine finite-difference methods for two-point boundary value problems, as their analysis requires little theoretical background. Upwinding, artificial diffusion, uniformly convergent methods, and Shishkin meshes are some of the topics presented. Throughout, the authors are concerned with the accuracy of solutions when the diffusion coefficient is close to zero. Later in the book they concentrate on finite element methods for problems posed in one and two dimensions. This lucid yet thorough account of convection-dominated convection-diffusion problems and how to solve them numerically is meant for beginning graduate students, and it includes a large number of exercises. An up-to-date bibliography provides the reader with further reading.

Robust Computational Techniques for Boundary Layers - Paul Farrell 2000-03-30
Current standard numerical methods are of little use in solving mathematical problems involving boundary layers. In Robust Computational Techniques for Boundary Layers, the authors construct numerical methods for solving problems involving differential equations that have non-smooth solutions with singularities related to boundary layers. They present a new numerical technique that provides precise results in the boundary layer regions for the problems discussed in the book. They show that this technique can be adapted in a natural way to a real flow problem, and that it can be used to construct benchmark solutions for comparison with solutions found using other numerical techniques. Focusing on robustness, simplicity, and wide applicability rather than on optimality, Robust Computational Techniques for Boundary Layers provides readers with an understanding of the underlying principles and the essential components needed for the construction of numerical methods for boundary layer problems. It explains the fundamental ideas through physical insight, model problems, and computational experiments and gives details of the linear solvers used in the computations so that readers can implement the methods and reproduce the numerical results.

hp-Finite Element Methods for Singular Perturbations - Jens M. Melenk 2004-10-20
Many partial differential equations arising in practice are parameter-dependent problems that are of singularly perturbed type. Prominent examples include plate and shell models for small thickness in solid mechanics, convection-diffusion problems in fluid mechanics, and equations arising in semi-conductor device modelling. Common features of these problems are layers and, in the case of non-smooth geometries, corner singularities. Mesh design principles for the efficient approximation of both features by the hp-version of the finite element method (hp-FEM) are proposed in this volume. For a class of singularly

perturbed problems on polygonal domains, robust exponential convergence of the hp-FEM based on these mesh design principles is established rigorously.

Recent Advances in Numerical Methods and Applications II - Oleg P Iliev 1999-07-05
This volume contains the proceedings of the 4th International Conference on Numerical Methods and Applications. The major topics covered include: general finite difference, finite volume, finite element and boundary element methods, general numerical linear algebra and parallel computations, numerical methods for nonlinear problems and multiscale methods, multigrid and domain decomposition methods, CFD computations, mathematical modeling in structural mechanics, and environmental and engineering applications. The volume reflects the current research trends in the specified areas of numerical methods and their applications. Contents: Computational Issues in Large Scale Eigenvalue ProblemsCombustion Modeling in Industrial FurnacesMonte Carlo MethodsMultilevel Methods for Incompressible Viscous FlowsApproximation of Nonlinear and Functional PDEsSolving Linear Systems with Error ControlRegular Numerical Methods for Inverse and Ill-Posed ProblemsMultifield ProblemsParallel and Distributed Numerical Computing with ApplicationsParameter-Robust Numerical Methods for Singularly Perturbed and Convection-Dominated ProblemsFinite Difference MethodsFinite Element MethodsFinite Volume MethodsBoundary Element MethodsNumerical Linear AlgebraNumerical Methods for Nonlinear ProblemsNumerical Methods for Multiscale ProblemsMultigrid and Domain DecompositionComputational Fluid DynamicsMathematical Modelling in Structural MechanicsEnvironmental ModellingEngineering Applications Readership: Researchers in applied mathematics and computational physics. Keywords:Numerical Methods and Applications;General Finite Difference;General Numerical Linear Algebra;Parallel Computations;Nonlinear Problems and Multiscale Methods

Single Perturbation Problems in Chemical Physics - John J. H. Miller 2009-09-09
The Matching Method for Asymptotic Solutions in Chemical Physics Problems by A. M. Il'in, L. A. Kalyakin, and S. I. Maslennikov Singularly Perturbed Problems with Boundary and Interior Layers: Theory and Application by V. F. Butuzov and A. B. Vasilieva Numerical Methods for Singularly Perturbed Boundary Value Problems Modeling Diffusion Processes by V. L. Kolmogorov and G. I. Shishkin An important addition to the Advances in Chemical Physics series, this volume makes available for the first time in English the work of leading Russian researchers in singular perturbation theory and its application. Since boundary layers were first introduced by Prandtl early in this century, rapid advances have been made in the analytic and numerical investigation of these phenomena, and nowhere have these advances been more notable than in the Russian school of singular perturbation theory. The three chapters in this volume treat various aspects of singular perturbations and their numerical solution, and represent some of the best work done in this area: * The first chapter, "The Matching Method for Asymptotic Solutions in Chemical Physics Problems," is concerned with the analysis of some singular perturbation problems that arise in chemical kinetics. In this chapter the matching method is applied to find asymptotic solutions to some dynamical systems of ordinary differential equations whose solutions have multiscale time dependence. * The second chapter, "Singularly Perturbed Problems with Boundary and Interior Layers: Theory and Application," offers a comprehensive overview of the theory and application of asymptotic approximations for many different kinds of problems in chemical physics governed by either ordinary or partial differential equations with boundary and interior layers. * The third chapter, "Numerical Methods for Singularly Perturbed Boundary Value Problems Modeling Diffusion Processes," discusses the numerical difficulties that arise in solving the problems described in the first two chapters, and proposes rigorous criteria for determining whether or not a numerical method is satisfactory for such problems. Methods satisfying these criteria are then constructed and applied to obtain numerical solutions to a range of sample problems. Timely, authoritative, and invaluable to researchers in all areas of chemical physics, Singular Perturbation Problems in Chemical Physics is an essential resource.

Numerical Analysis and Its Applications - Svetozar Margenov 2009-03-09
the conference participants. We also thank M. Koleva for the help in putting together the book.

Robust Numerical Methods for Singularly Perturbed Differential Equations - Hans-Görg Roos 2008-09-17
This new edition incorporates new developments in numerical methods for singularly perturbed differential

equations, focusing on linear convection-diffusion equations and on nonlinear flow problems that appear in computational fluid dynamics.

Boundary and Interior Layers, Computational and Asymptotic Methods - BAIL 2014 - Petr Knobloch 2016-04-19
This volume offers contributions reflecting a selection of the lectures presented at the international conference BAIL 2014, which was held from 15th to 19th September 2014 at the Charles University in Prague, Czech Republic. These are devoted to the theoretical and/or numerical analysis of problems involving boundary and interior layers and methods for solving these problems numerically. The authors are both mathematicians (pure and applied) and engineers, and bring together a large number of interesting ideas. The wide variety of topics treated in the contributions provides an excellent overview of current research into the theory and numerical solution of problems involving boundary and interior layers.

Numerical Analysis and Its Applications - Lubin Vulkov 2003-07-31
This book constitutes the thoroughly refereed post-proceedings of the Second International Conference on Numerical Analysis and Its Applications, NAA 2000, held in Rousse, Bulgaria in June 2000.The 90 revised papers presented were carefully selected for inclusion in the book during the two rounds of inspection and reviewing. All current aspects of numerical analysis are addressed. Among the application fields covered are computational sciences and engineering, chemistry, physics, economics, simulation, etc.

Differential Equations and Applications - Valarmathi Sigamani 2021
This book collects select papers presented at the International Conference on Applications of Basic Sciences, held at Tiruchirappalli, Tamil Nadu, India, from 19-21 November 2019. The book discusses topics on singular perturbation problems, differential equations, numerical analysis, fuzzy logics, fuzzy differential equations, and mathematical physics, and their interdisciplinary applications in all areas of basic sciences: mathematics, physics, chemistry, and biology. It will be useful to researchers and scientists in all disciplines of basic sciences. This book will be very useful to know the different scientific approaches for a single physical system.

Parameter Uniform Numerical Methods for Singular Perturbation Problems - Jugal Mohapatra 2012-04
Singularly perturbed boundary-value problems(SPP) arise in several branches of engineering and applied mathematics where the edge effects are important. These problems are often described by differential equations where the highest order derivative is multiplied by an arbitrarily small parameter` `known as the singular perturbation parameter. The solution of these problems possesses boundary (or interior) layers which are thin narrow regions in the neighborhood of the boundary (or interior) of the domain, where the gradient of the solution becomes very high as goes to zero. Classical numerical schemes fails to yield satisfactory numerical approximations on uniform grids due to the presence of boundary layers. To solve SPP, fitted mesh methods are often followed which comprise of standard finite difference operators on specially designed meshes. The aim of this book revolves around developing, analyzing and optimizing the - uniform upwind based fitted mesh methods resolving the convection-dominated layer type problems using non uniform grids.

Numerical Mathematics and Advanced Applications 2011 - Andrea Cangiani 2013-01-20
The European Conferences on Numerical Mathematics and Advanced Applications (ENUMATH) are a series of conferences held every two years to provide a forum for discussion of new trends in numerical mathematics and challenging scientific and industrial applications at the highest level of international expertise. ENUMATH 2011 was hosted by the University of Leicester (UK) from the 5th to 9th September 2011. This proceedings volume contains more than 90 papers by speakers of the conference and gives an overview of recent developments in scientific computing, numerical analysis, and practical use of modern numerical techniques and algorithms in various applications. New results on finite element methods, multiscale methods, numerical linear algebra, and finite difference schemes are presented. A range of applications include computational problems from fluid dynamics, materials, image processing, and molecular dynamics.

Numerical Methods and Applications - Ivan Dimov 2003-07-01
This book constitutes the thoroughly refereed post-proceedings of the 5th International Conference on Numerical Methods and Applications, NMA 2002, held in Borovets, Bulgaria, in August 2002. The 58 revised full papers presented together with 6 invited papers were carefully selected from numerous submissions during two rounds of reviewing and improvement. In accordance with various mini-symposia, the papers are organized in topical sections on Monte Carlo and Quasi-Monte Carlo methods, robust iterative solution methods and applications, control and uncertainty systems, numerical methods for sensor data processing, as well as in a section comprising various other methods, tools, and applications.

Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2016 - Marco L. Bittencourt 2017-11-07
This book features a selection of high-quality papers chosen from the best presentations at the International Conference on Spectral and High-Order Methods (2016), offering an overview of the depth and breadth of the activities within this important research area. The carefully reviewed papers provide a snapshot of the state of the art, while the extensive bibliography helps initiate new research directions.

Proceedings Of The Second Asian Mathematical Conference 1995 - Tangmanee S 1998-02-17
This proceedings volume covers the main fields of mathematics: analysis, algebra and number theory, geometry and topology, combinatorics and graphs, applied mathematics, numerical analysis and computer mathematics, probability and statistics, teaching and popularization of mathematics.

Advances in Applied Mathematics - Ali R. Ansari 2014-08-04
This volume contains contributions from the Gulf International Conference in Applied Mathematics, held at the Gulf University for Science & Technology. The proceedings reflects the three major themes of the conference. The first of these was mathematical biology, including a keynote address by Professor Philip Maini. The second theme was computational science/numerical analysis, including a keynote address by Professor Grigorii Shishkin. The conference also addressed more general applications topics, with papers in business applications, fluid mechanics, optimization, scheduling problems and engineering applications, as well as a keynote by Professor Ali Nayfeh.

Fitted Numerical Methods for Singular Perturbation Problems - John J. H. Miller 2012
Since the first edition of this book, the literature on fitted mesh methods for singularly perturbed problems has expanded significantly. Over the intervening years, fitted meshes have been shown to be effective for an extensive set of singularly perturbed partial differential equations. In the revised version of this book, the reader will find an introduction to the basic theory associated with fitted numerical methods for singularly perturbed differential equations. Fitted mesh methods focus on the appropriate distribution of the mesh points for singularly perturbed problems. The global errors in the numerical approximations are measured in the pointwise maximum norm. The fitted mesh algorithm is particularly simple to implement in practice, but the theory of why these numerical methods work is far from simple. This book can be used as an introductory text to the theory underpinning fitted mesh methods.

Historical Developments in Singular Perturbations - Robert E. O'Malley 2014-11-19
This engaging text describes the development of singular perturbations, including its history, accumulating literature, and its current status. While the approach of the text is sophisticated, the literature is accessible to a broad audience. A particularly valuable bonus are the historical remarks. These remarks are found throughout the manuscript. They demonstrate the growth of mathematical thinking on this topic by engineers and mathematicians. The book focuses on detailing how the various methods are to be applied. These are illustrated by a number and variety of examples. Readers are expected to have a working knowledge of elementary ordinary differential equations, including some familiarity with power series techniques, and of some advanced calculus. Dr. O'Malley has written a number of books on singular perturbations. This book has developed from many of his works in the field of perturbation theory.

Mathematical Analysis and its Applications - P. N. Agrawal 2015-08-22
This book discusses recent developments in and the latest research on mathematics, statistics and their applications. All contributing authors are eminent academics, scientists, researchers and scholars in their respective fields, hailing from around the world. The book presents roughly 60 unpublished, high-quality and peer-reviewed research papers that cover a broad range of areas including approximation theory, harmonic analysis, operator theory, fixed-point theory, functional differential equations, dynamical and control systems, complex analysis, special functions, function spaces, summability theory, Fourier and

wavelet analysis, and numerical analysis – all of which are topics of great interest to the research community – while further papers highlight important applications of mathematical analysis in science, engineering and related areas. This conference aims at bringing together experts and young researchers in mathematics from all over the world to discuss the latest advances in mathematical analysis and at promoting the exchange of ideas in various applications of mathematics in engineering, physics and biology. This conference encourages international collaboration and provides young researchers an opportunity to learn about the current state of the research in their respective fields.