

Contents

Contributors

Preface

Part One	DEVELOPMENT OF ALGORITHMS	1
1.	Spline Approximation	3
	Constrained spline approximation of functions and data based on constrained knot removal <i>E. Arge, M. Dæhlen, T. Lyche*</i> and <i>K. Morken</i>	4
	Near real-time spline fitting of long sequences of uniformly-spaced data <i>G. T. Anthony†</i> and <i>M. G. Cox</i>	21
	An algorithm for knot location in bivariate least squares spline approximation <i>M. Bozzini†</i> and <i>F. de Tisi</i>	30
	A knot placement strategy for least squares spline fitting based on the use of local polynomial approximations <i>M. G. Cox, P. M. Harris†</i> and <i>H. M. Jones</i>	37
	An algorithm for nonlinear splines with non-negativity constraints <i>G. Opfer†</i>	46
	Spline curve fitting of digitized contours <i>C. Potier†</i> and <i>C. Vercken</i>	54
	A B-spline approximation algorithm for quasi-interpolation or filtering <i>C. Rabut†</i>	62
	On knots and nodes for spline interpolation <i>P. W. Smith†</i>	72

2. Polynomial and Piecewise Polynomial Approximation	79
A basis for certain spaces of multivariate polynomials and exponentials	80
<i>W. Dahmen*</i>	
Monotone piecewise cubic data fitting	99
<i>F. N. Fritsch†</i>	
Direct and converse results on simultaneous approximation by the method of Bernstein-Durrmeyer operators	107
<i>M. Heilmann and M. W. Müller‡</i>	
Orthogonality and approximation in a Sobolev space	117
<i>A. Iserles‡, P. E. Koch, S. P. Nørsett and J. M. Sanz-Serna</i>	
Piecewise polynomial approximation of polynomial curves	5
<i>M. A. Lachance‡</i>	
Calculation of the energy of a piecewise polynomial surface	4
<i>E. Quak‡ and L. L. Schumaker</i>	
3. Interpolation	145
Radial basis function interpolation on an infinite regular grid	146
<i>M. D. Buhmann‡ and M. J. D. Powell*</i>	
The Fourier operator of even order and its application to an extremum problem in interpolation	170
<i>L. Brutman‡</i>	
On multivariate polynomial interpolation	177
<i>N. Dyn‡ and A. Ron</i>	
Algorithms for the construction of data dependent triangulations	185
<i>N. Dyn, D. Levin and S. Rippa‡</i>	
Algorithms for computing best parametric cubic interpolation	193
<i>C. Rademacher and K. Scherer‡</i>	
4. Smoothing and Constraint Methods	209
Data fitting by penalized least squares	210
<i>M. Von Golitschek and L. L. Schumaker*</i>	

	A semiinfinite programming algorithm for constrained best approximation	228
	<i>K. W. Bosworth</i> [†]	
	Inference region for a method of local approximation by using the residuals	236
	<i>M. Bozzini and L. Lenarduzzi</i> [†]	
5.	Complex Approximation	245
	Numerical methods for Chebyshev approximation of complex-valued functions	246
	<i>G. A. Watson</i> [*]	
	A fast algorithm for linear complex Chebyshev approximation	265
	<i>P. T. P. Tang</i> [†]	
Part Two	APPLICATIONS	275
6.	Computer Aided Design and Geometric Modelling	277
	Uniform subdivision algorithms for curves and surfaces	278
	<i>N. Dyn, J. A. Gregory</i> [*] and <i>D. Levin</i>	
	Approximation by spheres	296
	<i>T. B. Boffey</i> [†] , <i>M. G. Cox</i> , <i>L. M. Delves</i> and <i>C. J. Pursglove</i>	
	Interpolation of scattered data on a spherical domain	303
	<i>T. A. Foley</i> [†]	
	Least squares best fit geometric elements	311
	<i>A. B. Forbes</i> [†]	
	Uniform piecewise approximation on the sphere	320
	<i>W. Freeden</i> [†] and <i>J. C. Mason</i>	
7.	Applications in Numerical Analysis	335
	Approximation theory and numerical linear algebra	336
	<i>L. N. Trefethen</i> [*]	
	An algorithm for computing minimum norm solutions of the finite moment problem	361
	<i>M. Frontini</i> [†] , <i>G. Rodriguez</i> and <i>S. Seatzu</i>	
	Numerical solution of the biharmonic equation using different types of bivariate spline functions	369
	<i>R. H. J. Gmelig Meyling</i> [†]	

Quadrature solution of integral equations: a uniform treatment of Fredholm and Volterra equations <i>G. O. Olaofe</i> †	377
Increasing the convergence modulus of an asymptotic expansion: an algorithm for numerical differentiation <i>G. Walz</i> †	387
Approximation and parameter estimation in ordinary differential equations <i>J. Williams</i> †	395
8. Applications in Other Disciplines	405
Applications of discrete L_1 methods in science and engineering <i>C. Zala</i> and <i>I. Barrodale</i> *	406
Constrained complex approximation algorithms in communication engineering <i>J. C. Mason</i> *, <i>A. E. Trefethen</i> and <i>S. J. Wilde</i>	424
Integration of absolute amplitude from a decibel B-spline fit <i>R. W. Allen</i> † and <i>J. G. Metcalfe</i>	449
A nonlinear least squares data fitting problem arising in microwave measurement <i>M. G. Cox</i> and <i>H. M. Jones</i> †	458
A complex minimax algorithm for phase-only adaptation in antenna arrays <i>J. C. Mason</i> and <i>S. J. Wilde</i> †	466
Part Three CATALOGUE OF ALGORITHMS	477
A catalogue of algorithms for approximation <i>E. Grosse</i> *	479

*Invited Speaker

†Speaker