

Contents

Preface	vii
Invited presentations at the symposium	ix
Adaptive low-rank approximations for operator equations: Accuracy control and computational complexity MARKUS BACHMAYR and WOLFGANG DAHMEN	1
The Prager–Synge theorem in reconstruction based a posteriori error estimation FLEURIANNE BERTRAND and DANIELE BOFFI	45
Linear and nonlinear fractional elliptic problems JUAN PABLO BORTHAGARAY, WENBO LI, and RICARDO H. NOCHETTO	69
Lattice algorithms for multivariate approximation in periodic spaces with general weight parameters RONALD COOLS, FRANCES Y. KUO, DIRK NUYENS, and IAN H. SLOAN	93
Multiscale modeling, homogenization and nonlocal effects: Mathematical and computational issues QIANG DU, BJORN ENGQUIST, and XIAOCHUAN TIAN	115
The Stokes complex: A review of exactly divergence–free finite element pairs for incompressible flows MICHAEL NEILAN	141
Finite element methods for Maxwell’s equations PETER MONK and YANGWEN ZHANG	159
Partial differential equation regularization for supervised machine learning ADAM M. OBERMAN	177
Iterative methods for linear systems of equations: A brief historical journey YOUSEF SAAD	197
The IEQ and SAV approaches and their extensions for a class of highly nonlinear gradient flow systems JIE SHEN and XIAOFENG YANG	217

A class of bound-preserving high order schemes: The main ideas and recent developments CHI-WANG SHU	247
BDDC domain decomposition algorithms OLOF B. WIDLUND	261
Computing modular polynomials and isogenies of rank two Drinfeld modules over finite fields PERLAS CARANAY, MATTHEW GREENBERG, and RENATE SCHEIDLER	283
A new ranking function for polynomial selection in the number field sieve NICOLAS DAVID and PAUL ZIMMERMANN	315
A nilpotent quotient algorithm for finitely presented associative \mathbb{Z} -algebras and its application to integral group rings BETTINA EICK and TOBIAS MOEDE	327
A tale of two omegas MICHAEL J. MOSSINGHOFF and TIMOTHY S. TRUDGIAN	343