

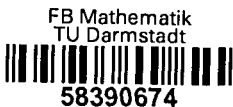
Lecture Notes in Mathematics

Edited by A. Dold and B. Eckmann

1129

Numerical Analysis Lancaster 1984

Proceedings of the SERC Summer School
held in Lancaster, England, Jul. 15 – Aug. 3, 1984



Edited by P.R. Turner

Fachbereich Mathematik
Technische Hochschule Darmstadt
Bibliothek

Inv.-Nr. 3 20 430



Springer-Verlag
Berlin Heidelberg New York Tokyo

CONTENTS

Preface		iii
List of participants		iv
Lecture programme		vii
Five lectures on the Algorithmic Aspects of Approximation		1
Theory	E.W. Cheney	
1. Generalized Rational Approximation		1
2. The Alternating Algorithm in Uniformly Convex Spaces		5
3. The Alternating Algorithm in Non-Uniformly Convex Spaces		8
4. Minimal Projections		11
5. Numerical Construction of Chebyshev Centers		16
Lectures on Optimal Recovery	C.A. Micchelli and T.J. Rivlin	21
1. Introduction		21
2. General Theory of Optimal Recovery		28
3. Optimal Recovery in Hilbert Spaces		37
4. Stochastic Information		44
5. Restricted Estimation		46
6. Optimal Information		51
7. Stochastic Optimal Recovery		62
8. Optimal Interpolation of Analytic Functions		69
9. Optimal Numerical Integration		74
10. Miscellaneous		83
References		90
An Introduction to the Analysis of the Error in the Finite Element Method for Second-Order Elliptic Boundary Value Problems.	A. Schatz	94
Introduction		94
1. Notation and some Preliminaries		96
2. Two Model Elliptic Boundary Value Problems		99
3. The Finite Element Spaces and some of their Properties		100
4. The Galerkin method, the Finite Element method and basic error estimate in $L^2(\Omega)$ and $W^{1,2}(\Omega)$		113
5. Local Error Estimates		119
6. Error estimates in the maximum norm		127
Bibliography		139

Variational Theory and Approximation of Boundary

140

Value Problems

R.E. Showalter

1. Introduction	140
2. Variational Method in Hilbert Space	147
3. Function Spaces	154
4. Boundary Value Problems	161
5. Existence and Approximation	171