## CONTENTS

PREFACE

Gene H. Golub, vii

THE PERFIDIOUS POLYNOMIAL James H. Wilkinson, 1

NEWTON'S METHOD

Jorge J. Moré and D. C. Sorensen, 29

RESEARCH DIRECTIONS IN SPARSE MATRIX COMPUTATIONS

Iain S. Duff, 83

QUESTIONS OF NUMERICAL CONDITIONS RELATED TO POLYNOMIALS Walter Gautschi, 140

A GENERALIZED CONJUGATE GRADIENT METHOD FOR THE NUMERICAL SOLUTION OF ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS Paul Concus, Gene H. Golub, and Dianne P. O'Leary, 178

SOLVING DIFFERENTIAL EQUATIONS ON A HAND HELD PROGRAMMABLE CALCULATOR *J. Barkley Rosser*, 199

FINITE DIFFERENCE SOLUTION OF BOUNDARY VALUE PROBLEMS IN ORDINARY DIFFERENTIAL EQUATIONS V. Pereyra, 243

MULTIGRID METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS Dennis C. Jespersen, 270

FAST POISSON SOLVERS Paul N. Swarztrauber, 319

POISSON'S EQUATION IN A HYPERCUBE: DISCRETE FOURIER METHODS, EIGENFUNCTION EXPANSIONS, PADE APPROXIMATION TO EIGENVALUES Peter Henrici, 371

**INDEX, 413**