CONTENTS

PREFACE	v
SOUND NUMBERS FOR COMPUTING SOUND L.B. Felsen	1
INSIGHTS ON MARINE ACOUSTICS CONCEIVED FROM SPACE (IMACS) P.D. Scully-Power	3
AN ANALYTICAL SOLUTION FOR THE THREE-DIMENSIONAL ACOUSTIC FIELD IN A PENETRABLE OCEAN WEDGE M.J. Buckingham	17
RANGE-DEPENDENT CANONICAL SOLUTIONS FOR SHALLOW OCEAN ACOUSTICS I.T. Lu and L.B. Felsen	33
MULTIGRID PRECONDITIONERS APPLIED TO THREE-DIMENSIONAL PARABOLIC EQUATION TYPE MODELS C.I. Goldstein	57
AN EFFICIENT METHOD FOR SOLVING THE THREE-DIMENSIONAL WIDE ANGLE WAVE EQUATION D. Lee, Y. Saad, and M.H. Schultz	75
FINITE DIFFERENCE COMPUTATIONS OF THREE-DIMENSIONAL SOUND PROPAGATION W.L. Siegman, D. Lee, and G. Botseas	91
THE SOLUTION OF WIDE-ANGLE THREE-DIMENSIONAL PARABOLIC APPROXIMATIONS ON HYPERCUBES M.H. Schultz	111
THE CONSISTENCY OF MODELS OF SOUND WAVES IN FLUIDS G. Birkhoff	117
BOUNDARY INTEGRAL EQUATION/ELEMENT METHODS IN COMPUTATIONAL ACOUSTICS R.P. Shaw, T. Fukui, and H.C. Wang	157
APPROXIMATION BY FINITE DIFFERENCE SCHEMES OF THE PROPAGATION OF ACOUSTIC WAVES IN STRATIFIED MEDIA	
J.C. Guillot and P. Joly THE INFLUENCE OF THE ELASTICITY OF THE OCEAN BOTTOM ON WAVE PROPAGATION	177
J.T. KUO	199
R.A. Stephen	225
PROBLEM IN A FLUID-SOLID COUPLED MEDIUM Yu-Chiung Teng and J.T. Kuo	239

vii

Contents

ANALYSIS OF FLUID EQUATIONS BY GROUP METHODS W.F. Ames and M.C. Nucci	259
INVARIANT SOLUTIONS OF EQUATIONS ARISING IN OCEAN ACOUSTICS P.C. Richards and W.F. Ames	277
SPINNING THE HELMHOLTZ EQUATION R.G. Levers	287
THE ANALOGY BETWEEN NUMERICAL WAVE PROPAGATION AND QUANTUM MECHANICS R. Vichnevetsky	295
VARIATIONAL METHODS TO IMPROVE COMPUTATIONAL ALGORITHMS FOR ACOUSTIC RADIATION AND SCATTERING A.D. Pierce	323
ACOUSTICAL RADIATION IN THE PRESENCE OF TEMPERATURE GRADIENTS: A WAVE ENVELOPE FINITE ELEMENT APPROACH R.J. Astley	343
RAPID EVALUATION OF RADIATION FIELDS IN UNDERWATER ACOUSTICS I.B. Bernstein and V. Rokhlin	357
A FAST,FILTERED, FOURIER-TRANSFORM MARCHING ALGORITHM FOR WIDE-ANGLE, ONE-WAY WAVE PROPAGATION L. Fishman and S.C. Wales	369
MATHEMATICAL MODELING OF DIFFERENTIAL EQUATIONS BY DIFFERENCE EQUATIONS R.E. Mickens	387
BENCHMARKS - PURPOSE AND PERSPECTIVES L.B. Felsen	395
MARCHING METHODS FOR ELLIPTIC MODELS OF UNDERWATER SOUND PROPAGATION	205
G.H. KNIGHTLY AND D.F. St. Mary	397
D.F. St. Mary and D. Lee	409

viii