

Contents

CHA	PTER 1 INTRODUCTION	1
1.1	Basic ideas	1
1.2	Boundary solutions and other methods	2
СНА	PTER 2 WEIGHTED RESIDUAL METHODS	6
2.1	Basic concepts	6
2.2	Weighted residual methods	10
2.3		25
2.4	Functionals and Rayleigh-Ritz method	31
2.5	Subsidiary conditions	35
2.6	Boundary methods	41
	Bibliography	45
СНА	PTER 3 POTENTIAL PROBLEMS	46
3.1	Introduction	46
3.2	Basic relationships	47
3.3	Boundary elements	52
3.4	Simple computer program	58
3.5	Computer program for linear elements	73
3.6	Quadratic and higher order elements	81
3.7	Poisson's equation	86
3.8	Orthotropic case	89
3.9	Problems with more than one surface	92
3.10	Non-homogeneous solids	99
3.11	The Helmholtz equation	102
	References	102
СНА	PTER 4 ELASTICITY PROBLEMS	104
4.1	Introduction	104
4.2	Linear theory of elasticity	104
4.3	Basic relationships	116
4.4	Three-dimensional applications	131
4.5	Initial stress or strain fields	134
	References	138
CHA	PTER 5 TWO-DIMENSIONAL ELASTICITY	139
5.1	Introduction	139
5.2	Computer program	145
5.3	Linear and higher order elements	165
5.4	Non-homogeneous case	169
5.5	Anisotropic solution	174
	References	176

CONTENTS

CHAPTER 6 FINAL REMARKS	177
6.1 Relationship of boundary elements with finite elements	177
6.2 'Indirect' method	180
6.3 Conclusions	183
References	184
APPENDIX 1 NUMERICAL INTEGRATION FORMULAE	185
1. One-dimensional Gaussian quadrature	185
2. Two- and three-dimensional Gaussian quadrature for rectangles a	ınd
rectangular hexahedra	185
3. Triangular domain	186
4. One-dimensional logarithmic Gaussian quadrature formulae	187
References, Bibliography	188
INDEX	189

