

# Table of Contents

|     |  |     |
|-----|--|-----|
| I   | Analytic Methods in the Theory of Elasticity .....               | 1   |
| 1.  | Introduction .....   | 1   |
| 2.  | Boundary value problems for isotropic bodies .....               | 6   |
| 3.  | Complex representation of stresses and displacements .....       | 12  |
| 4.  | Anisotropic plates .....   | 15  |
| 5.  | Shell theory .....   | 22  |
| 6.  | Generalized hyperanalytic function theory .....                  | 44  |
| 7.  | References and further remarks .....                             | 54  |
| II  | Boundary Value Problems .....                                    | 59  |
| 1.  | The Riemann–Hilbert problem for the hypermembrane equation ..... | 59  |
| 2.  | Kernel functions for second order equations .....                | 64  |
| 3.  | Reproducing kernels for higher order operators .....             | 74  |
| 4.  | Fichera’s single layer method .....                              | 87  |
| 5.  | Complete families for elliptic equations .....                   | 108 |
| 6.  | Nonlinear Elliptic Equations .....                               | 137 |
| 7.  | Added Remarks and References .....                               | 150 |
| III | The Schwarz Function and Hele Shaw Flows .....                   | 155 |
| 1.  | Schwarz functions and quadrature domains .....                   | 155 |
| 2.  | The two–dimensional Hele Shaw problem .....                      | 171 |
| 3.  | The $n$ –dimensional problem .....                               | 184 |
| 4.  | Anisotropic Hele Shaw flows .....                                | 199 |
| 5.  | Remarks and further references .....                             | 227 |
| IV  | Transmutations .....   | 229 |
| 1.  | Transmutation à la Carroll .....                                 | 229 |
| 2.  | Ocean acoustics .....  | 246 |
| 3.  | Entire solutions for linear elliptic equations .....             | 270 |
| 4.  | Remarks and further references .....                             | 277 |

|   |  |     |
|---|--|-----|
| V | Elliptic Partial Differential Equations in Two Variables with Analytic Coefficients..... | 279 |
|   | 1. Representation for solutions of second order equations .....                          | 281 |
|   | 2. Special representation formulae.....  | 300 |
|   | 3. Higher-order elliptic equations in the plane.....                                     | 320 |
|   | 4. Integral operator methods for higher-order equations .....                            | 339 |
|   | 5. Remarks and further references.....   | 345 |
| • | <b>References and Further Reading</b> .....  | 349 |
| • | <b>Index of Names</b> .....  | 389 |
| • | <b>Index of Subjects</b> .....   | 393 |