TABLE OF CONTENTS

| PART | I Karl Wilhelm Bauer | |
|---------|-------------------------------------------------------------------------------------------------------------|------------|
| | Differential Operators for Partial Differential Equations | 5 1 |
| INTROD | DUCTION | 2 |
| CHAPTE | R I Representation of solutions by differential operators | |
| 1) | Polynomial operators for the differential equation | _ |
| | $\frac{\mathbf{w}_{\mathbf{z}} + \mathbf{A}\mathbf{w}_{\mathbf{z}}}{\mathbf{z}} + \mathbf{B}\mathbf{w} = 0$ | 5 |
| | a) Holomorphic generators | 5 |
| | b) Antiholomorphic generators | 16 |
| 2) | The differential equation $\omega^2 w + (n-m)\phi' \omega w - n(m+1)\phi' \overline{\psi'} w=0$ | 23 |
| | a) A general representation theorem for the solutions | |
| | defined in simply connected domains | 23 |
| | b) General expansion theorems for the solutions in the | |
| | neighbourhood of isolated singularities | 25 |
| | c) The special cases $w = -n(n+1)Gw = 0$ and $z\overline{z}$ | |
| | $(1+\varepsilon z\overline{z})^2 w + \varepsilon n(n+1)w = 0$ | 29 |
| 3) | Differential operators on solutions of differential | |
| | equations of the form $w = + Aw + Bw = 0$ | 43 |
| 4) | Linear Backlund transformations for differential equations | |
| | of the type $w + Bw = 0$ $z\overline{z}$ | 56 |
| 5) | A generalized Darboux equation | 61 |
| 6) | The differential equation $\omega^2 w + C \varphi' \overline{\psi}^T w = 0$, $C \in \mathbb{C}$ | 68 |
| 7) | Differential operators for a class of elliptic differential | |
| | equations of even order | 75 |
| 8) | Differential equations in several independent complex | |
| | variables | 84 |
| | Differential operators on solutions of the heat equation | 95 |
| 10) | Bergman operators with polynomials as generating functions | 104 |
| 11) | Vekua operators | 114 |
| CHAPTE: | R II Applications | 117 |
| 1) | Spherical surface harmonics and harmonics | 117 |
| | A representation of the surface harmonics of degree n in | . , , |
| | n dimensione | 123 |

| 3) Pseudo-analytic functions and complex potentials | 128 |
|--------------------------------------------------------------------------------------|-----|
| a) Representation of the solutions of the differential | |
| equation $w = c\overline{w}$ with $m^2(\log c) = c\overline{c}$, $m \in \mathbb{N}$ | 128 |
| b) Representation of pseudo-analytic functions by means | |
| of solutions of the generalized Darboux equation | 140 |
| c) Representation of pseudo-analytic functions by integro- | |
| differential-operators | 141 |
| 4) A generalized Tricomi equation | 144 |
| a) Representation of the solutions in the elliptic | |
| respectively hyperbolic half-plane | 144 |
| b) Fundamental solutions in the large | 149 |
| 5) Generalized Stokes-Beltrami systems | 155 |
| 6) The iterated equation of generalized axially symmetric | |
| potential theory | 170 |
| | 178 |
| REFERENCES | • |
| SUBJECT INDEX | 188 |
| D0D0101 1110011 | |
| | |
| PART II Stephan Ruscheweyh | 401 |
| On the Function Theory of the Bauer-Peschl Equation | 191 |
| | 193 |
| INTRODUCTION | |
| CHAPTER 1 | 195 |
| Structure of solutions | |
| CHAPTER 2 | 205 |
| Dirichlet problems for circles | |
| CHAPTER 3 | 211 |
| Functions with restricted range, Schwarz Lemma | |
| CHAPTER 4 Univalent solutions, Riemann Mapping Theorem | 219 |
| | |
| CHAPTER 5 | 227 |
| Spaces of Hardy type | |
| CHAPTER 6 Summability, Abel's Theorem | 230 |
| CHAPTER 7 | |
| Range problems | 236 |
| CHAPTER 8 | |
| Uniqueness theorems | 240 |
| Altifacticas circorema | |

| CHAPTER 9 | | |
|------------------------------------------|-----|--|
| Isolated singularities, Picard's Theorem | 243 | |
| CHAPTER 10 | | |
| Analytic continuation | 246 | |
| CHAPTER 11 | | |
| Automorphic functions | 248 | |
| | | |
| REFERENCES | | |
| | | |
| SUBJECT INDEX | 254 | |
| | | |
| GLOSSARY | 257 | |