

Contents

| | |
|---|-----|
| Preface | vii |
| Notation and Terminology | xi |
| Chapter 1. The Heat Operator, Temperatures and Mean Values | 1 |
| 1.1. Temperatures and Heat Balls | 1 |
| 1.2. Mean Values of Smooth Functions over Heat Spheres | 3 |
| 1.3. Mean Values of Smooth Subtemperatures over Heat Spheres | 7 |
| 1.4. Mean Values of Smooth Subtemperatures over Heat Balls | 13 |
| 1.5. The Boundary Maximum Principle on Circular Cylinders | 17 |
| 1.6. Modified Heat Balls | 19 |
| 1.7. Harnack Theorems | 25 |
| 1.8. Equicontinuous Families of Temperatures | 29 |
| 1.9. Notes and Comments | 31 |
| Chapter 2. The Poisson Integral for a Circular Cylinder | 35 |
| 2.1. The Cauchy Problem on a Half-Space | 35 |
| 2.2. The Dirichlet Problem on a Circular Cylinder | 37 |
| 2.3. Double Layer Heat Potentials | 39 |
| 2.4. The Poisson Integral and the Caloric Measure | 44 |
| 2.5. Characterizations of Temperatures | 47 |
| 2.6. Extensions of some Harnack Theorems | 51 |
| 2.7. Notes and Comments | 52 |
| Chapter 3. Subtemperatures and the Dirichlet Problem on Convex Domains of Revolution | 53 |
| 3.1. Semicontinuous Functions | 53 |
| 3.2. Subtemperatures | 55 |
| 3.3. The Dirichlet Problem on Convex Domains of Revolution | 64 |
| 3.4. Boundary Behaviour of the PWB Solution | 69 |
| 3.5. Characterizations of Hypotemperatures and Subtemperatures | 71 |
| 3.6. Properties of Hypotemperatures | 80 |
| 3.7. Thermic Majorants | 82 |
| 3.8. Notes and Comments | 83 |
| Chapter 4. Temperatures on an Infinite Strip | 85 |
| 4.1. An Extension of the Maximum Principle on an Infinite Strip | 85 |
| 4.2. Gauss-Weierstrass Integrals | 87 |
| 4.3. Nonnegative Temperatures | 95 |
| 4.4. Minimality of the Fundamental Temperature | 101 |
| 4.5. Notes and Comments | 103 |

| | |
|--|-----|
| Chapter 5. Classes of Subtemperatures on an Infinite Strip | 105 |
| 5.1. Hyperplane Mean Values and Classes of Subtemperatures | 105 |
| 5.2. Behaviour of the Hyperplane Mean Values of Subtemperatures | 114 |
| 5.3. Classes of Subtemperatures and Nonnegative Thermic Majorants | 119 |
| 5.4. Characterizations of the Gauss-Weierstrass Integrals of Functions | 123 |
| 5.5. Notes and Comments | 126 |
| Chapter 6. Green Functions and Heat Potentials | 127 |
| 6.1. Green Functions | 127 |
| 6.2. Green Functions and the Adjoint Heat Equation | 131 |
| 6.3. Heat Potentials | 134 |
| 6.4. The Distributional Heat Operator | 140 |
| 6.5. The Riesz Decomposition Theorem | 146 |
| 6.6. Monotone Approximation by Smooth Supertemperatures | 150 |
| 6.7. Further Characterizations of Subtemperatures | 151 |
| 6.8. Supertemperatures on an Infinite Strip or Half-Space | 152 |
| 6.9. Notes and Comments | 157 |
| Chapter 7. Polar Sets and Thermal Capacity | 159 |
| 7.1. Polar Sets | 159 |
| 7.2. Families of Supertemperatures | 162 |
| 7.3. The Natural Order Decomposition | 166 |
| 7.4. Reductions and Smoothed Reductions | 170 |
| 7.5. The Thermal Capacity of Compact Sets | 175 |
| 7.6. The Thermal Capacity of More General Sets | 178 |
| 7.7. Thermal and Cothermal Capacities | 183 |
| 7.8. Capacitable Sets | 183 |
| 7.9. Polar Sets and Heat Potentials | 187 |
| 7.10. Thermal Capacity and Lebesgue Measure | 188 |
| 7.11. Notes and Comments | 192 |
| Chapter 8. The Dirichlet Problem on Arbitrary Open Sets | 195 |
| 8.1. Classification of Boundary Points | 196 |
| 8.2. Upper and Lower PWB Solutions | 199 |
| 8.3. Resolutivity and PWB Solutions | 205 |
| 8.4. The Caloric Measure on the Essential Boundary | 207 |
| 8.5. Boundary Behaviour of PWB Solutions | 214 |
| 8.6. Geometric Tests for Regularity | 222 |
| 8.7. Green Functions, Heat Potentials, and Thermal Capacity | 225 |
| 8.8. Notes and Comments | 228 |
| Chapter 9. The Thermal Fine Topology | 231 |
| 9.1. Definitions and Basic Properties | 231 |
| 9.2. Further Properties of Reductions | 237 |
| 9.3. The Fundamental Convergence Theorem | 240 |
| 9.4. Applications of the Fundamental Convergence Theorem to Reductions | 244 |
| 9.5. Thermal Thinness and the Regularity of Normal Boundary Points | 249 |
| 9.6. Thermal Fine Limits and Euclidean Limits | 252 |
| 9.7. Thermal Thinness and the Quasi-Lindelöf Property | 253 |

| | |
|-------------------------|-----|
| 9.8. Notes and Comments | 257 |
| Bibliography | 259 |
| Index | 263 |