

CONTENTS

| | |
|---|-----|
| PREFACE | iii |
| CONTENTS | v |
| CHAPTER 0. INTRODUCTION | 1 |
| CHAPTER 1. A PRIORI BOUNDS | 22 |
| 1. Introduction | 22 |
| 2. Geometric Preliminaries | 24 |
| 3. The Basic Inequality | 27 |
| 4. A lower Bound for $(\nabla u \cdot \nabla u)$ | 32 |
| 5. Far-field Behavior of Coefficients of the $ Lu ^2$ and $ u ^2$ -terms | 37 |
| 6. The Radiation Integral | 39 |
| 7. A Priori Estimates in Weighted L_2 -norms | 41 |
| 8. An A Priori Estimate for $ u(x, \lambda) $ | 45 |
| CHAPTER 2. GLOBAL EXISTENCE, SMOOTHNESS, AND NONFOCUSSING OF OPTICAL PATHS IN A REFRACTIVE MEDIUM | 48 |
| 1. Introduction | 48 |
| 2. Ray Coordinate Systems and Convexity Relative to $n^{\frac{1}{2}}(x)$ | 52 |
| 3. An Existence Theorem | 59 |
| 4. Solution of the Ray Equations | 62 |
| 5. Existence of Ray Fields on Unbounded Domains | 66 |
| 6. First Derivatives of X and the Jacobian | 77 |
| 7. Higher Derivatives of X | 78 |
| 8. The Main Theorem | 82 |
| CHAPTER 3. A UNIFORM APPROXIMATION TO THE SOLUTION OF URSELL'S RADIATING BODY PROBLEM | 84 |
| 1. Introduction | 84 |
| 2. The Ansatz | 87 |
| 3. Analysis of the A^j and B^{j-2} | 87 |
| 4. The Radiation Condition | 92 |
| 5. General Obstacles | 92 |
| 6. An Ansatz for More General Boundary Conditions | 92 |
| CHAPTER 4. EXISTENCE OF SOLUTIONS | 98 |
| INDEX | 103 |