

CONTENTS

Preface	1
Chapter 1. <u>Once Over Lightly</u>	3
1-1. Diophantine Equations and the Genus of an Algebraic Plane Curve	4
1-2. Zeros and Critical Points of Analytic Functions of One Complex Variable	13
1-3. Some General Problems of Nonlinear Analysis	20
1-4. Applications of Nonlinear Problems	25
Chapter 2. <u>Finite Dimensional Systems in \mathbb{R}^n</u>	31
2-1. The Definition of Degree of a Mapping	32
2-2. Some Properties of the Degree of a Mapping	45
2-3. Gradient Systems and Their Basic Properties	56
2-4. Gradient Systems with Nondegenerate Critical Points	64
2-5. Critical Points for General Gradient Systems	77
2-6. Systems Deformable to Gradient Systems	87
Chapter 3. <u>Infinite Dimensional Systems</u>	93
3-1. The Degree of a Class of Operators in Spaces of Infinite Dimension	95
3-2. A Special Class of Noncompact Operators	105
3-3. Gradient Operators and Their Properties	107
3-4. A Remark on the Theory of Critical Points of Infinite Dimensional Gradient Operators	117
3-5. Local Behavior of Nonlinear Operator Equations in Hilbert Space	118
Chapter 4. <u>Applications</u>	133
4-1. Global Univalence	133
4-2. Topics in Nonlinear Autonomous Ordinary Differential Equations	142
4-3. Topics in Elliptic Partial Differential Equations	159
Appendix I. <u>The Axioms of Homology Theory</u>	183
Appendix II. <u>Standard Results from Analysis</u>	186