

Contents

Chapter 1. Introduction	1
1.1 Formulation of the Problem	1
1.2 Discussion of Results	2
Chapter 2. The Variational Principle	4
2.1 The Magnetostatic Equations	4
2.2 Flux Constraints in the Plasma	6
2.3 The Ergodic Constraint	7
2.4 Coordinate System in the Plasma	8
2.5 First Variation of the Potential Energy	10
2.6 Vacuum Region and Force-Free Fields	11
2.7 Variation of the Vacuum Field	12
2.8 Variation of the Free Boundary	14
2.9 Coordinate System in the Vacuum	14
2.10 Accelerated Paths of Steepest Descent	17
2.11 Determination of the Acceleration Coefficients	18
Chapter 3. The Discrete Equations	22
3.1 The Numerical Method	22
3.2 Difference Equations for the Plasma Region	23
3.3 Difference Equations for the Vacuum Region	27
3.4 Iterative Scheme for the Plasma Region	28
3.5 Iterative Scheme for the Vacuum Region	29
3.6 Iterative Scheme for the Free Boundary	30
3.7 Remarks about the Method	31
3.8 Iterative Schemes for Elliptic Equations	33
Chapter 4. Description of the Computer Code	36
4.1 Introduction	36
4.2 Input Data	37

4.3	Printed Output	44
4.4	Glossary	45
Chapter 5. Applications		49
5.1	Historical Development of the Code	49
5.2	Comparison with Exact Solutions	49
5.3	Unstable High β Stellarator Equilibria	58
5.4	Triangular Cross Sections	63
5.5	High β Tokamaks	67
5.6	Discussion	69
References		70
Listing of the Code with Comment Cards		72
1.	Output from a Sample Run	72
2.	Fortran Listing	78
Index		141