

Contents

1.	Introduction	1
2.	Synopsis of the Method	3
	1. Variational principle	3
	2. Coordinate system	6
3.	Finite Difference Scheme	8
	1. Difference equations	8
	2. Island structure	10
	3. Accelerated iteration procedure	12
4.	Nonlinear Stability	15
	1. Second minimization	15
	2. Test functions and convergence studies	17
	3. Comparison with exact solutions	19
5.	The Mercier Criterion	22
	1. Local mode analysis	22
	2. Computational method	23
	3. Island width and anomalous diffusion	27
6.	Transport	28
	1. Classical and neoclassical models	28
	2. Flux coordinates	29

7. Stellarator Experiments	33
1. The mathematical model	33
2. The Heliotron E	35
3. The Wendelstein W VII-A	36
8. The ATF-1 and the WISTOR-U	40
1. Helical coil winding laws	40
2. Beta limits for the ATF-1	42
9. Heliac	48
1. Helically symmetric equilibria	48
2. Stability	48
3. Free boundary equilibria	52
10. References	57
11. Description of the Computer Code BETA	60
1. Introduction	60
2. Geometry	61
3. Initialization	63
4. Grids	63
5. Convergence	64
6. Stability	65
7. Iteration	67
8. Vacuum region	67
9. Printed output	68
10. Plots	69
12. Glossary	70
13. Sample Run	78
14. Listing of Code BETA with Comment Cards	84
Index	193