CONTENTS

			PREFACE	v
Р	art I		FEEDBACK CONTROL	
с	hapter	1	GENERAL FEEDBACK THEORIES FOR ELECTROSTATIC MODES	
		1.1	Feedback Stabilization of a Vlasov Plasma by M. Cotsaftis	1
		1.2	Plasma Confinement by Localized Feedback Control by P. K. C. Wang	6
		1.3	Geometrical Limitations in Plasma Feed- back Systems by J. M. Crowley	12
		1.4	Generalized Boundary Conditions of Plasma Feedback Systems by E. L. Lindman	17
		1.5	Plasma Stabilization by Feedback by J. B. Taylor and C. N. Lashmore-Davies	23
		1.6	Stabilization of a Low-Density Plasma in a Simple Magnetic Mirror by Feedback Control by C. N. Lashmore-Davies	27
		1.7	Plasma Control With Infrared Lasers by F. F. Chen	33
C	hapter	2	FEEDBACK THEORIES FOR MHD MODES	
		2.1	Feedback Stabilization of Hydromagnetic Continua: Review and Prospects by J. R. Melcher	38
		2.2	Nonlinear Stabilization of a Continuum by A. R. Millner and R. R. Parker	54

viii

Chapter

- 60 2.3 Videotype Sampling in the Feedback Stabilization of Electromechanical Equilibria by J. L. Dressler 2.4 Feedback Control of Kruskal-Shafranov 68 Modes by J. F. Clarke and R. A. Dory 2.5 Feedback Control Problems in Tokamaks 74 by H. P. Furth and P. H. Rutherford 2.6 Feedback Stabilization of a High- β Sharp-80 Boundaried Plasma Column with Helical Fields by F. L. Ribe and M. N. Rosenbluth 3 FEEDBACK EXPERIMENTS IN Q-DEVICES. DISCHARGES, AND SOLIDS 3.1 Nonlinear Collisionless Interaction Between 84 Electron and Ion Modes and Feedback Stabilization in Fusion Plasmas by A. Y. Wong, D. R. Baker, and N. Booth 3.2 Remote Feedback Stabilization of Drift Insta-94 bility by Microwaves by T. K. Chu, H. W. Hendel, F. W. Perkins, and T. C. Simonen 3.3 Experiments and Interpretation of Results 103 on the Feedback Stabilization of Various Plasma Instabilities by B. E. Keen 3.4 Feedback Suppression of Collisionless, 114 Multimode Drift-Centrifugal Waves in a Mirror-Confined Plasma by N. E. Lindgren and C. K. Birdsall
- 3.5 Feedback Applications to Basic Plasma 119 Instability Experiments by T. C. Simonen

- 3.6 Characteristics of a Modified Feedback 129 Control Method Applied to Edge Oscillations in a Q Machine by G. L. J. Műller, J. C. Corbin, and R. S. Palmer
- 3.7 Passive Feedback Stabilization 138 by C. Carlyle
- 3.8 Feedback Stabilization of the Transverse 142 Kelvin-Helmholtz Instability-Experiment and Theory by T.K. Chu, H. W. Hendel, D. L. Jassby, and T. C. Simonen
- 3.9 Feedback Experiments on Multimode Ioniza-149 tion Waves by A. Garscadden and P. Bletzinger
- 3.10 Feedback Stabilization and Measurement of 160 Stability Coefficients in Electron-Hole Plasmas
 by B. Ancker-Johnson, H. Fossum, and A. Y. Wong
- Chapter 4 FEEDBACK EXPERIMENTS IN PINCHES, STELLARATORS, AND MIRRORS
 - 4.1 Observation of Plasma Displacement Due to 166 Dipole Current Near a High-Beta Plasma Column
 by A. A. Newton, J. Junker, and
 H. A. B. Bodin
 - 4.2 Feedback Control of Collisional Drift 170
 Waves in a Toroidal Stellarator
 by C. W. Hartman, H. W. Hendel, and
 R. H. Munger
 - 4.3 Feedback Experiments in a Hot Electron 177 Plasma by Glenn Haste

 $\mathbf{i}\mathbf{x}$

 \mathbf{x}

4.4 Feedback Experiments on a High Energy 180 Plasma Contained in the Phoenix II Simple Mirror Machine by V. A. Chuyanov, E. G. Murphy, D. R. Sweetman, and E. Thompson
4.5 Feedback Stabilization of the Rarefied 188 Plasma Cyclotron Instability by V. A. Chuyanov, V. Kh. Likhtenshtein,

D. A. Panov, and V. A. Zhil'tsov

- Part II DYNAMIC CONTROL
- Chapter 5 DYNAMIC-STABILIZATION THEORIES FOR ELECTROSTATIC MODES
 - 5.1 Dynamic Stabilization of Plasma Insta bilities
 by H. Lashinsky and E. M. Dewan
 - 5.2 Dynamic Stabilization of a Confined Plasma 206 by A. Samain
 - 5.3 Dynamic Stabilization of Drift Waves in a 210 Collisionless Plasma by A.C. Electric Fields
 by M. Dobrowolny
 - 5.4 Dynamic Stabilization of the Drift Dissipa- 214 tive Instability by an Inhomogeneous R.F. Field by D. Lépéchinsky, P. Rolland, and J. Teichmann
 - 5.5 Influence of High-Frequency Field on 221 Plasma Instabilities by A. A. Ivanov and V. F. Muraview
 - 5.6 Electron-Ion Collision Effects on Parametric Instability by R. A. Stern, T. Kawabe, and P. K. Kaw

6 DYNAMIC-STABILIZATION THEORIES FOR MHD MODES

Chapter

- 6.1 Dynamic Stabilization of High- β Plasmas 231 by F. Troyon
- 6.2 On Dynamic Stabilization of MHD Insta-bilitiesby H. Wobig and H. Tasso
- 6.3 Dynamic Stabilization of the m = 1 Instability in a Bumpy Theta Pinch by G. Berge
- Chapter 7 DYNAMIC-STABILIZATION EXPERIMENTS IN Q-DEVICES, DISCHARGES, AND BEAM-PLASMA SYSTEMS
 - 7.1 Preliminary Results on the Dynamic Stabilization of the "Drift-Dissipative" Instability by M. W. Alcock and B. E. Keen
 - 7.2 Suppression of Drift Instability by RF 255 Electric Field
 by Y. Nishida, M. Tanibayashi, and
 K. Ishii
 - 7.3 Dynamic Stabilization of a Two Stream 260 Ion Instability by J. F. Decker and A. M. Levine
 - 7.4 Suppression of Longitudinal Electron 264Oscillation by Beam Modulationby Y. Nakamura and S. Kojima
 - 7.5 Nonlinear Perturbations and Electron 266
 Scattering in a Beam Plasma
 by J. E. Walsh, D. Bancroft, R. W.
 Layman, and P. B. Lewis

Chapter	8	DYNAMIC-STABILIZATION EXPERIMENTS
		IN PINCHES

- 8.1 Dynamic Stabilization of the Z-Pinch 274by J. A. Phillips, P. R. Forman,A. Haberstich, and H. Karr
- 8.2 Dynamic Stabilization Experiment on a 286
 Linear Screw Pinch
 by G. Becker, O. Gruber, and H. Herold

.

- Chapter 9 DYNAMIC-STABILIZATION EXPERIMENTS IN FLUIDS AND SOLIDS. CUSP LOSS CONTROL
 - 9.1 Dynamic Stabilization of Hydrodynamic 293 Interchange Instabilities - a Model for Plasma Physics by G.-H. Wolf
 - 9.2 Dynamic Stabilization of Helical and 305 Sausage Modes in Electron-Hole Plasmas by B. Ancker-Johnson
 - 9.3 Dynamic Control of Cusp Loss 310
 by T. Sato, S. Miyake, T. Watari, T. Watanabe, S. Hiroe, K. Takayama, and K. Husimi
 - 9.4 Hot Electron Confinement in a Cusped 315
 Magnetic Field by ECRH Wrapping
 by S. Aihara, M. Fujiwara, M. Hosokawa, and H. Ikegami

Bibliography320Author Index349

Subject Index 357