

CONTENTS

PREFACE	v
FIXED POINT THEORY AND NONLINEAR PROBLEMS	
<i>Themistocles M. Rassias</i>	1
GLOBAL LINEARIZATION ITERATIVE METHODS AND NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS III	
<i>Mieczyslaw Altman</i>	23
1. Introduction	23
2. A Rapidly Convergent Iteration Method	24
3. Smoothing Operators Combined with Elliptic Regularization and the Degree of Elliptic Regularization	34
4. Elliptic Regularization	41
5. Periodic Solutions of Nonlinear Hyperbolic Partial Differential Equations	44
ON GENERALIZED POWER SERIES AND GENERALIZED OPERATIONAL CALCULUS AND ITS APPLICATION	
<i>M. A. Al-Bassam</i>	51
1. Introduction	51
2. T^α -Functions	55
3. Some Elementary T^α -Functions	63
4. Some Operational Properties	73
5. Some Applications	81
MULTIPLE SOLUTIONS TO PARAMETRIZED NONLINEAR DIFFERENTIAL SYSTEMS FROM NIELSEN FIXED POINT THEORY	
<i>Robert F. Brown</i>	89
1. Introduction	90
2. Operator Theory	90
3. Nielsen Fixed Point Theory	91
4. Parametrized Differential Systems	93
5. An Example	95
THE TOPOLOGY OF IND-AFFINE SETS	
<i>P. Cherenack</i>	99
1. Introduction	99
2. Ind-affine Sets	101

3.	Basic Open Sets for Ind-affine Sets	103
4.	Spectral and Ind-affine Topologies	114
ALMOST APPROXIMATELY POLYNOMIAL FUNCTIONS		
<i>Piotr W. Cholewa</i>		127
COHOMOLOGY CLASSES AND FOLIATED MANIFOLDS		
<i>Mircea Craioveanu & Mircea Puta</i>		137
1.	Differential Forms and De Rham Currents on Foliated Manifolds	137
2.	d_F -Cohomology	143
3.	Basic De Rham Cohomology	149
4.	F-Relative Cohomology	152
5.	Global Stability Properties for Foliated and Basic Forms and Basic De Rham Currents	153
BIFURCATION AND NONLINEAR INSTABILITY IN APPLIED MATHEMATICS		
<i>Lokenath Debnath</i>		161
1.	Introduction	162
2.	The Navier-Stokes Equations and Instability Problems in Fluid Dynamics	164
3.	Benjamin's Classification of Bifurcation	165
4.	Chandrasekhar's Problem of Gravitational Instability of Viscous Fluids	167
5.	Rayleigh's Problem of Inviscid Parallel Flows	169
6.	The Linear Rayleigh-Taylor Instability Problem in Two Inviscid Fluids	172
6.1	Nonlinear Rayleigh-Taylor Instability	174
7.	The Linear Kelvin-Helmholtz Instability Problem in Two Inviscid Streams	180
7.1	Nonlinear Kelvin-Helmholtz Instability Problem	183
8.	The Linear Taylor Instability Problem of Viscous Flow between Rotating Cylinders	192
9.	The Görtler and the Dean Problems	198
10.	The Bénard Problem and Thermal Instability	200
11.	Linear Instability of Parallel Flows	205
12.	Nonlinear Instability in Viscous Flows	212
12.1	Nonlinear Instability of Plane Poiseuille Flows	216
12.2	Nonlinear Taylor Problem	221
12.3	Nonlinear Thermal Instability	225
12.4	Instability of Blood Flow in the Aorta	229

13.	Instability and Bifurcation of Nonlinear Wavetrains	233
13.1	The Benjamin - Feir Instability of Water Waves	234
13.2	The Whitham Instability Theory	238
13.3	The Nonlinear Schrödinger Equation	242
13.4	Bifurcation of Large Amplitude Waves	252
14.	Stability of Elastic Systems	255
14.1	Euler's Problem	255
14.2	Nonlinear Elastic String	256
14.3	Dynamic Problem for the Nonlinear Rotating Inextensible String	258
14.4	The Euler Problem of Elastica	260
14.5	The Euler Bifurcation Problem of Elastica	263
14.6	The von Karman Problem of Nonlinear Buckling of an Elastic Plate	266

THE STABILITY OF THE WEAKLY ADDITIVE FUNCTIONAL	
<i>Hamid Drljević</i>	287

INDEX THEORY FOR G-BUNDLE PAIRS WITH APPLICATIONS	
TO BORSUK-ULAM TYPE THEOREMS FOR G-SPHERE BUNDLES	
<i>Edward Fadell & Sufian Husseini</i>	307
1. Introduction	307
2. Index Theory over B	308
3. Additional Basic Properties	321
4. Theorems of the Borsuk-Ulam Type	325

NONLINEAR APPROXIMATION AND MOMENT PROBLEM	
<i>J. S. Hwang & G. D. Lin</i>	337
1. Introduction	337
2. Approximation	340
3. Dense and Completeness	340
4. Proof of Theorem 2	341
5. Functions Orthogonal to $\langle x^{\alpha_n} \rangle$	341
6. Fourier Transforms	343
7. Proof of Theorem 4	344
8. Proof of Theorem 3	346
9. Dense and Monotonicity	347
10. Completeness and Discontinuity	348
11. Proof of Theorem 6	349
12. Problems and Remarks	351

PERIODS IN EQUICONTINUOUS TOPOLOGICAL DYNAMICAL SYSTEMS	
<i>A. Iwanik, L. Janos & Z. Kowalski</i>	355
1. Introduction and Notation	355
2. Pointwise Periodic Equicontinuous Systems	356
3. General Equicontinuous Systems	358
CONTINUATION THEOREMS FOR SEMI-LINEAR EQUATIONS IN BANACH SPACES: A SURVEY	
<i>J. Mawhin & K. P. Rybakowski</i>	367
1. Introduction.	368
2. Compact-like Perturbations of Linear Fredholm Mappings of Index Zero	370
3. Compact-like Perturbations of Linear Fredholm Mappings of Positive Index	375
4. The Homotopy Index.	381
5. A Continuation Principle for the Homotopy Index and Periodic Solutions of Second Order Gradient Systems.	388
6. Monotone-like Nonlinear Perturbations of Some Linear Operators in Hilbert Spaces	396
ON CONTRACTIFIABLE SELF-MAPPINGS	
<i>Philip R. Meyers</i>	407
1. Introduction.	407
2. A Converse where X is Compact.	410
3. The General Converse.	413
4. Families of Operators.	417
5. Operators on the Real Line	421
6. Fixed Point Theorems	426
NORMAL STRUCTURES AND NONEXPANSIVE MAPPINGS IN BANACH SPACES	
<i>James L. Nelson, K. L. Singh & J. H. M. Whitfield</i>	433
1. Introduction.	433
2. Some Counterexamples	434
3. Spaces with Normal Structure	438
4. Weak* Normal Structure.	452
5. Asymptotic Normal Structure	454
6. Normal Structure Coefficients	455
7. Lipschitzian Mapping	458

8. Fixed Points in Banach Lattices	466
9. Miscellaneous	472
Appendix	482
SURVEY ON UNIQUENESS AND CLASSIFICATION THEOREMS FOR MINIMAL SURFACES	
<i>Themistocles M. Rassias</i>	493
1. Uniqueness Theorems for Minimal Surfaces	493
2. On the Classification of Complete Minimal Surfaces	501
CONTRACTIVE DEFINITIONS	
<i>B. E. Rhoades</i>	513
ON KY FAN'S THEOREM AND ITS APPLICATIONS (SURVEY)	
<i>S. P. Singh</i>	527
FIXED POINTS OF AMENABLE SEMIGROUPS OF DIFFERENTIABLE OPERATORS	
<i>Paolo M. Soardi</i>	539
RESEARCH PROBLEMS ON NONLINEAR EQUATIONS	
<i>Themistocles M. Rassias</i>	545