

TABLE OF CONTENTS

CHAPTER I

METRIC SPACES

§ 1.	FUNCTIONS (OPERATORS). LIMITING PROCESS	1
§ 2.	METRIC AND TOPOLOGICAL SPACES.	3
§ 3.	EXAMPLES OF METRIC SPACES	9
§ 4.	COMPLETE SPACES. EXAMPLES	22
§ 5.	COMPLETENESS OF METRIC SPACES	30
§ 6.	TWO THEOREMS ON COMPLETE SPACES	38
§ 7.	PRINCIPLE OF CONTRACTION MAPPING	40
§ 8.	SEPARABLE SPACES	48
§ 9.	COMPACTNESS IN METRIC SPACES	52
§ 10.	CRITERIA FOR COMPACTNESS OF SETS IN SPECIAL SPACES	61
§ 11.	ALMOST PERIODIC FUNCTIONS	71

CHAPTER II

LINEAR SPACES AND LINEAR OPERATORS

§ 12.	ALGEBRAIC OPERATIONS IN ARBITRARY SETS.	76
§ 13.	LINEAR SPACES	87
§ 14.	LINEAR OPERATORS	97
§ 15.	NORMED LINEAR SPACES	108
§ 16.	SPACES AND SUBSPACES OF FINITE DIMENSION	113
§ 17.	ABSTRACT HILBERT SPACE	122
§ 18.	LINEAR OPERATORS IN NORMED LINEAR SPACES	134
§ 19.	SPACE OF LINEAR OPERATORS	141
§ 20.	INVERSE OPERATORS	148

CHAPTER III

LINEAR FUNCTIONALS

§ 21.	LINEAR FUNCTIONALS IN NORMED LINEAR SPACES	160
§ 22.	GENERAL FORM OF LINEAR FUNCTIONALS IN SPECIAL SPACES	171
§ 23.	CONJUGATE SPACES AND ADJOINT OPERATORS	193
§ 24.	WEAK CONVERGENCE OF SEQUENCES OF FUNCTIONAL	204
§ 25.	WEAK CONVERGENCE OF SEQUENCES OF ELEMENT	213
§ 26.	UNIVERSALITY OF $C [0,1]$	219

CHAPTER IV

COMPLETELY CONTINUOUS OPERATORS

§ 27.	COMPLETELY CONTINUOUS OPERATORS	228
§ 28.	BANACH SPACES WITH BASIS	236
§ 29.	LINEAR OPERATOR EQUATIONS WITH COMPLETELY CONTINUOUS OPERATORS IN A BANACH SPACE WITH BASIS.	248

CHAPTER V

ELEMENTS OF SPECTRAL THEORY : SELF ADJOINT OPERATORS IN HILBERT SPACES

§ 30.	SELF-ADJOINT OPERATORS	255
§ 31.	SPECTRUM OF SELF-ADJOINT OPERATORS	261
§ 32.	OPERATORS WITH PURE POINT SPECTRUM	270
§ 33.	PROJECTION	274
§ 34.	POSITIVE OPERATORS.	280
§ 35.	SQUARE ROOTS OF POSITIVE OPERATORS.	283
§ 36.	SPECTRAL ANALYSIS OF A SELF-ADJOINT OPERATOR	286
§ 37.	OPERATOR FUNCTIONS. RESOLVENTS	294

CHAPTER VI

SOME PROBLEMS OF NON-LINEAR FUNCTIONAL ANALYSIS

§ 38.	DIFFERENTIATION OF ABSTRACT FUNCTIONS OF REAL VARIABLES	304
§ 39.	INTEGRATION OF ABSTRACT FUNCTIONS. DIFFERENTIAL EQUATIONS	313

§ 40. HOMOGENEOUS FORMS AND POLYNOMIALS	324
§ 41. DIFFERENTIAL OF AN ABSTRACT FUNCTION	331
§ 42. DIFFERENTIALS AND DERIVATIVES OF HIGHER ORDER	340
§ 43. DIFFERENTIATION OF FUNCTIONS OF TWO VARIABLES	349
§ 44. THEOREMS ON IMPLICIT FUNCTIONS	352
§ 45. APPLICATIONS OF THEOREM ON IMPLICIT FUNCTIONS	360
§ 46. TANGENTIAL MANIFOLDS	368
§ 47. EXTREMA	379
APPENDIX : I. INEQUALITIES	383
II. DEFINITIONS OF n -th DERIVATIVE OF A FUNCTION OF REAL VARIABLES	391
BIBLIOGRAPHY	397
INDEX	403