

Contents

PREFACE	xi
Definition	xiii
CHAPTER I	
KLEINIAN GROUPS AND RIEMANN SURFACES	1
§1 Kleinian groups	2
§2 Riemann surfaces	9
§3 Weyl's lemma	22
§4 Examples	31
CHAPTER II	
THE ORBIT SPACE OF A KLEINIAN GROUP	43
§1 The Poincaré metric	43
§2 Signature of a surface and parabolic cusps	46
§3 Poincaré area and construction of funda- mental domains	62
CHAPTER III	
BANACH SPACES OF AUTOMORPHIC FORMS	85
§1 An operation on functions	85
§2 Spaces of automorphic forms	86
§3 Existence theorems for automorphic forms	89
§4 The simply connected case	92
§5 More on the simply connected case	101
§6 The connected case	104
§7 The general case	108
§8 Spaces of cusp forms An alternate proof (for special cases) of the duality theorem	108
§9 Existence theorems for automorphic functions	119

CHAPTER IV**APPROXIMATION THEOREMS FOR HOLOMORPHIC FUNCTIONS . 127**

- §1 Bers' approximation theorem 127
 §2 Consequences and comments 141

CHAPTER V**EICHLER COHOMOLOGY FOR KLEINIAN GROUPS 147**

- §1 Eichler cohomology 148
 §2 Generalized Beltrami coefficients 162
 §3 An inverse to the Bers map β^* 176
 §4 Holomorphic Eichler integrals 196
 §5 The first structure theorem for
 $H^1(\Gamma, \Pi_{2q-2})$ 205
 §6 A map on cusp forms 210
 §7 Meromorphic Eichler integrals
 The second structure theorem for
 $H^1(\Gamma, \Pi_{2q-2})$ 219
 §8 Eichler integrals with singularities
 A Riemann-Roch theorem for Eichler
 integrals 237

CHAPTER VI**APPLICATIONS TO CLASSICAL FUNCTION THEORY 261**

- §1 The Riemann-Roch theorem 261
 §2 The case $q = 1$ 270
 §3 Differentials on compact Riemann surfaces 273
 §4 The Jacobi inversion problem 299

CHAPTER VII**APPLICATIONS TO MODERN FUNCTION THEORY 323**

- §1 Ahlfors' finiteness theorem
 Bers' area inequalities 324
 §2 Function theory on open surfaces
 The Behnke-Stein results 343
 §3 Cohomology for open surfaces
 An alternate proof of the structure theorem
 for $H^1(\Gamma, \Pi_{2q-2})$ 359
 §4 The Bers approximation theorem is almost
 sharp 381
 §5 Isomorphism theorems for rings of
 holomorphic functions 388

Bibliography 423

List of Symbols Used 457

Index 462