

# Table of contents

Introduction		1
Chapter I	Preliminaries	
§1.1	Kählerian geometry	7
§1.2	Connections and Characteristic forms	17
§1.3	Simons classes	23
§1.4	Characteristic classes of foliations	28
Chapter II	Kähler-Einstein metrics and extremal Kähler metrics	
§2.1	Kähler-Einstein metrics	31
§2.2	Extremal Kähler metrics	33
§2.3	Matsushima-Lichnerowicz-Calabi theorem	34
§2.4	Ricci curvature and holomorphic vector fields	39
§2.5	Examples of Levine and Burns	43
Chapter III	The character $f$ and its generalization to Kählerian invariants	
§3.1	The definition of the character $f$	46
§3.2	Generalization to Kählerian invariants	47
§3.3	Relation to extremal Kähler metrics	52
§3.4	Barycenter of moment map	54
Chapter IV	The character $f$ as an obstruction	
§4.1	Integrability condition of Kazdan and Warner	56
§4.2	An example with nontrivial $f$ and reductive $\mathfrak{h}(M)$	60
§4.3	Non-homogeneous Kähler-Einstein manifolds	62
Chapter V	The character $f$ as a classical invariant	
§5.1	Lefschetz numbers	68
§5.2	Invariant polynomials of $H(M)$	69
§5.3	Linear dependence relations	76
§5.4	Relation to equivariant cohomology	81
Chapter VI	Lifting $f$ to a group character	
§6.1	Godbillon-Vey invariant	87

§6.2	The imaginary part of the lift $\tilde{f}$ of $f$	89
§6.3	K-energy map	94
§6.4	Lifting as a representation on $H(M, K_M^{-n})$	97
Chapter VII	The character $f$ as a moment map	
§7.1	Del Pezzo surfaces	99
§7.2	Symplectic reduction	100
§7.3	Computation of Ricci curvature	104
§7.4	A simple formula for $f$	110
Chapter VIII	Aubin's approach and related results	
§8.1	Aubin's approach	113
§8.2	Uniqueness of Kähler-Einstein metrics with positive sign	116
§8.3	Manifolds with bounded K-energy	125
§8.4	Tian's invariant and existence results	127
References		133
Index		140