

# Contents

<b>Preface</b> .....	V
1 List of Research Publications of Hans Grauert .....	VII
2 List of Doctoral Students of Hans Grauert .....	XII
3 Program of Göttingen Conference for the 70th Birthday of Hans Grauert .....	XIV
4 List of Participants of Göttingen Conference .....	XVI
<b>Even Sets of Eight Rational Curves on a K3-surface</b> .....	1
<i>Wolf Barth</i>	
0 Introduction .....	1
1 Double Sextics with Eight Nodes .....	3
2 Double Sextics with Eight Tritangents .....	4
3 Quartic Surfaces with Eight Nodes .....	12
4 Quartic Surfaces with Eight Lines .....	14
5 Double Quadrics with Eight Nodes .....	21
6 Double Quadrics with Eight Double Tangents .....	23
7 Comments .....	24
References .....	24
<b>A Reduction Map for Nef Line Bundles</b> .....	27
<i>Thomas Bauer, Frédéric Campana, Thomas Eckl, Stefan Kebekus, Thomas Peternell, Sławomir Rams, Tomasz Szemberg, Lorenz Wotzlaw</i>	
1 Introduction .....	27
2 A Reduction Map for Nef Line Bundles .....	28
3 A Counterexample .....	34
References .....	36
<b>Canonical Rings of Surfaces Whose Canonical System has Base Points</b> .....	37
<i>Ingrid C. Bauer, Fabrizio Catanese, Roberto Pignatelli</i>	
0 Introduction .....	37
1 Canonical Systems with Base Points .....	42
2 The Canonical Ring of Surfaces with $K^2 = 7, p_g = 4$ Birational to a Sextic: From Algebra to Geometry .....	49
3 The Canonical Ring of Surfaces with $K^2 = 7, p_g = 4$ Birational to a Sextic: Explicit Computations .....	58
4 An Explicit Family .....	63
References .....	67
Appendix 1 .....	69

Appendix 2 .....	70
<b>Attractors</b> .....	73
<i>Araceli M. Bonifant, John Erik Fornæss</i>	
1 Introduction .....	73
2 Endomorphisms .....	74
3 Hyperbolic Diffeomorphisms .....	77
4 Holomorphic Endomorphisms of $\mathbb{P}^k$ .....	79
References .....	83
<b>A Bound on the Irregularity of Abelian Scrolls in Projective Space</b> .....	85
<i>Ciro Ciliberto, Klaus Hulek</i>	
0 Introduction .....	85
1 Non-Existence of Scrolls .....	86
2 Existence of Scrolls .....	88
References .....	92
<b>On the Frobenius Integrability of Certain Holomorphic <math>p</math>-Forms</b> .....	93
<i>Jean-Pierre Demailly</i>	
1 Main Results .....	93
2 Proof of the Main Theorem .....	95
References .....	97
<b>Analytic Moduli Spaces of Simple (Co)Framed Sheaves</b> .....	99
<i>Hubert Flenner, Martin Lübke</i>	
1 Introduction .....	99
2 Preparations .....	101
3 Simple $\mathcal{F}$ -Coframed Sheaves .....	104
4 Proof of Theorem 1.1 .....	105
References .....	108
<b>Cycle Spaces of Real Forms of <math>SL_n(\mathbb{C})</math></b> .....	111
<i>Alan T. Huckleberry, Joseph A. Wolf</i>	
1 Background .....	111
2 Schubert Slices .....	114
3 Cycle Spaces of Open Orbits of $SL_n(\mathbb{R})$ and $SL_n(\mathbb{H})$ .....	121
References .....	132
<b>On a Relative Version of Fujita's Freeness Conjecture</b> .....	135
<i>Yujiro Kawamata</i>	
1 Introduction .....	135
2 Review on the Hodge Bundles .....	137
3 Parabolic Structure in Several Variables .....	138
4 Base Change and a Relative Vanishing Theorem .....	141
5 Proof of Theorem 1.7 .....	144

References .....	146
<b>Characterizing the Projective Space after Cho, Miyaoka and Shepherd-Barron</b> .....	147
<i>Stefan Kebekus</i>	
1 Introduction .....	147
2 Setup .....	148
3 Proof of the Characterization Theorem .....	150
References .....	154
<b>Manifolds With Nef Rank 1 Subsheaves in <math>\Omega_X^1</math></b> .....	157
<i>Stefan Kebekus, Thomas Peternell, Andrew J. Sommese</i>	
1 Introduction .....	157
2 Generalities .....	158
3 The Case Where $\kappa(X) = 1$ .....	158
4 The Case Where $\kappa(X) = 0$ .....	159
References .....	163
<b>The Simple Group of Order 168 and K3 Surfaces</b> .....	165
<i>Keiji Oguiso, De-Qi Zhang</i>	
0 Introduction .....	165
1 The Niemeier Lattices .....	168
2 Proof of the Main Theorem .....	170
References .....	180
<b>A Precise <math>L^2</math> Division Theorem</b> .....	185
<i>Takeo Ohsawa</i>	
0 Introduction .....	185
1 $L^2$ Extension Theorem on Complex Manifolds .....	186
2 Extension and Division .....	188
3 Proof of Theorem .....	189
References .....	191
<b>Irreducible Degenerations of Primary Kodaira Surfaces</b> .....	193
<i>Stefan Schröer, Bernd Siebert</i>	
0 Introduction .....	193
1 Smooth Kodaira Surfaces .....	195
2 $D$ -semistable Surfaces with Trivial Canonical Class .....	197
3 Hopf Surfaces .....	199
4 Ruled Surfaces over Elliptic Curves .....	207
5 Rational Surfaces and Honeycomb Degenerations .....	211
6 The Completed Moduli Space and its Boundary .....	217
References .....	221

**Extension of Twisted Pluricanonical Sections with Plurisubharmonic Weight and Invariance of Semipositively Twisted Plurigenera for Manifolds Not Necessarily of General Type ... 223**

*Yum-Tong Siu*

0	Introduction .....	224
1	Review of Existing Argument for Invariance of Plurigenera .....	228
2	Global Generation of Multiplier Ideal Sheaves with Estimates .....	234
3	Extension Theorems of Ohsawa-Takegoshi Type from Usual Basic Estimates with Two Weight Functions .....	241
4	Induction Argument with Estimates .....	248
5	Effective Version of the Process of Taking Powers and Roots of Sections .....	256
6	Remarks on the Approach of Generalized Bergman Kernels.....	264
	References .....	276

**Base Spaces of Non-Isotrivial Families of Smooth Minimal Models .....** 279

*Eckart Viehweg, Kang Zuo*

1	Differential Forms on Moduli Stacks .....	283
2	Mild Morphisms .....	287
3	Positivity and Ampleness .....	294
4	Higgs Bundles and the Proof of 1.4 .....	301
5	Base Spaces of Families of Smooth Minimal Models .....	314
6	Subschemes of Moduli Stacks of Canonically Polarized Manifolds...	316
7	A Vanishing Theorem for Sections of Symmetric Powers of Logarithmic One Forms.....	321
	References .....	327

**Uniform Vector Bundles on Fano Manifolds and an Algebraic Proof of Hwang-Mok Characterization of Grassmannians .....** 329

*Jarostaw A. Wiśniewski*

0	Introduction .....	329
1	$\mathcal{M}$ -Uniform Manifolds .....	331
2	Atiyah Extension and Twisted Trivial Bundles .....	333
3	Characterization of Grassmann Manifolds .....	336
4	Characterization of Isotropic Grassmann Manifolds .....	337
	References .....	339