

Contents

Minimal Volume and Simplicial Volume of Visibility n-manifolds and All 3-manifolds	
<i>Jianguo Cao, Xiaoyang Chen</i>	1
1 Introduction	1
2 Simplicial Volume and Bounded Cohomology.....	4
3 Visibility Manifolds and Gromov-hyperbolic Spaces.....	6
4 Gromov's Simplicial Volume of Visibility n -manifolds and Compact 3-manifolds.....	10
References.....	12
Rigidity Theorems for Lagrangian Submanifolds of Complex Space Forms with Conformal Maslov Form	
<i>Xiaoli Chao, Yuxin Dong</i>	17
1 Introduction	17
2 Preliminaries.....	18
3 Rigidity Theorems for Lagrangian Submanifolds.....	20
References.....	25
Method of Moving Planes in Integral Forms and Regularity Lifting	
<i>Wenxiong Chen, Congming Li</i>	27
1 Introduction	27
2 Illustration of MMP in Integral Forms.....	32
3 Various Applications of MMP in Integral Forms.....	40
4 Regularity Lifting by Contracting Operators	45
5 Regularity Lifting by Combinations of Contracting and Shrinking Operators	50
References.....	59
The Ricci Curvature in Finsler Geometry	
<i>Xinyue Cheng</i>	63
1 Definitions and Notations	63
2 Ricci Curvature of Randers Metrics	67
3 Volume Comparison in Finsler Geometry.....	70
4 The Role of the Ricci Curvature in Projective Geometry	73

References.....	76
Specific Non-Kähler Hermitian Metrics on Compact Complex Manifolds	
<i>Jixiang Fu</i>	79
1 Introduction	79
2 Balanced Metrics Under the Conifold Transition.....	80
3 The Supersymmetric Solutions	82
4 The Form-type Calabi-Yau Equation.....	84
5 The Generalized Gauduchon Metrics	86
References.....	88
On the σ_2-scalar Curvature and Its Applications	
<i>Yuxin Ge, Guofang Wang</i>	91
1 Introduction	91
2 σ_2 -Yamabe Problem	92
3 A Quotient Equation.....	95
4 Ellipticity of a Quotient Equation and a 3-dimensional Sphere Theorem	98
5 A Rough Classification of Metrics of Positive Scalar Curvature ...	102
6 An Almost Schur Theorem.....	104
References.....	107
Isometric Embedding of Surfaces in \mathbb{R}^3	
<i>Qing Han</i>	113
1 Introduction	113
2 Local Isometric Embedding of Surfaces.....	114
3 Global Isometric Embedding of Surfaces.....	136
References.....	140
The Lagrangian Mean Curvature Flow Along the Kähler-Ricci Flow	
<i>Xiaoli Han, Jiayu Li</i>	147
1 Introduction	147
2 Lagrangian Property Is Preserved.....	148
References.....	153
On Magnetohydrodynamics with Partial Magnetic Dissipation near Equilibrium	
<i>Xianpeng Hu, Zhen Lei, Fang-Hua Lin</i>	155
1 Introduction	155
2 Reformulation of the Ideal MHD.....	158
3 Global Existence	159
4 Acknowledgement.....	163

References..... 164

Hyperbolic Gradient Flow: Evolution of Graphs in \mathbb{R}^{n+1}

De-Xing Kong, Kefeng Liu..... 165

1 Introduction..... 165

2 Hyperbolic Gradient Flow for Graphs in \mathbb{R}^{n+1} 166

3 The Evolution of Convex Hypersurfaces in \mathbb{R}^{n+1} 167

4 The Evolution of Plane Curves..... 172

5 Conclusions and Open Problems..... 176

References..... 177

The Moser-Trudinger and Adams Inequalities and Elliptic and Subelliptic Equations with Nonlinearity of Exponential Growth

Nguyen Lam, Guozhen Lu..... 179

1 Introduction..... 180

2 The Moser-Trudinger Inequalities..... 183

3 Adams Type Inequalities on High Order Sobolev Spaces..... 189

4 N -Laplacian on Bounded Domains in \mathbb{R}^N 193

5 Polyharmonic Equations on Bounded Domains in \mathbb{R}^{2m} 199

6 N -Laplacian Equations with Critical Exponential Growth in \mathbb{R}^N 202

7 Existence of Solutions to Polyharmonic Equations with Critical Exponential Growth in the Whole Space..... 215

8 Subcritical Exponential Growth in Bounded Domains..... 221

9 Equations of Q -sub-Laplacian Type with Critical Growth on Bounded Domains..... 226

10 Equations of Q -sub-Laplacian Type with Critical Growth in \mathbb{H}^n 232

11 Examples of Nonlinear Terms Without the Ambrosetti-Rabinowitz Condition..... 236

12 Sharp Moser-Trudinger Inequality on the Heisenberg Group at the Critical Case and Multiplicity of Solutions..... 237

13 A New Approach to Sharp Adams Inequalities for Arbitrary Integers and Less Restrictive Norms..... 243

References..... 246

Navigation Problem and Randers Metrics

Meng Li, Xiaohuan Mo, Ni Yu..... 253

1 Historical Remarks and Definitions..... 253

2 Navigation Problem..... 255

3 Flag Curvature Decreasing Property of Navigation Problem..... 257

4 New Finsler Metrics with Constant (Scalar) Flag Curvature from Old..... 258

5	Geodesics of a Finsler Metric Via Navigation Problem.....	260
6	A New Characterization of Randers Norms.....	260
7	Compact Randers Metrics with Constant S-curvature	261
8	Classification Results for Randers Metrics	263
9	Construction of Randers Metrics with Isotropic S-curvature	264
	References.....	265
Lorentzian Isoparametric Hypersurfaces in the Lorentzian		
Sphere S_1^{n+1}		
	<i>Zhen-Qi Li</i>	267
1	Introduction	267
2	Canonical Forms for Symmetric Transformation \mathbb{A} in Lorentzian Space.....	269
3	Lorentzian Isoparametric Hypersurface of Type I in S_1^{n+1}	273
4	Nonexistence of Lorentzian Isoparametric Hypersurface of Type IV in S_1^{n+1}	279
5	Lorentzian Isoparametric Hypersurface of Type II in S_1^{n+1}	283
6	Totally Umbilical Lorentzian Isoparametric Hypersurface of Type II in S_1^{n+1}	291
7	Semi-umbilical Lorentzian Isoparametric Hypersurface of Type II in S_1^{n+1}	304
8	Non-umbilical Lorentzian Isoparametric Hypersurface of Type II in S_1^{n+1}	310
	References.....	328
Asymptotically Hyperbolic Manifolds and Conformal Geometry		
	<i>Jie Qing</i>	329
1	Definitions.....	329
2	Regularity and Rigidity for AH Manifold.....	332
3	Correspondences.....	333
4	Generalized Yamabe Problems	338
	References.....	342
A Characterization of Randers Metrics of Scalar Flag Curvature		
	<i>Zhongmin Shen, Gulcin Civi</i>	345
1	Introduction	345
2	Preliminaries	348
3	A Formula for the Weyl Curvature	350
4	Proof of Theorem 1.1	351
5	Weak Einstein Metrics	354
6	Proof of Theorem 1.2	355
	References.....	357

Prescribed Weingarten Curvature Equations

Weimin Sheng, Neil S. Trudinger, Xu-Jia Wang **359**

1 Introduction 359

2 The Uniform Estimate 363

3 The Gradient Estimates 366

4 The Second Order Derivative Estimate 371

5 The Dirichlet Problem 376

6 Closed Convex Hypersurfaces 378

References 383

Geometry Problems Related with Quasi-local Mass in General Relativity

Yuguang Shi **387**

1 Introduction 387

2 Quasi-local Mass on Domains with Convex Boundaries 389

3 Quasi-local Mass on Domains with Non Convex Boundary 402

References 404

Concerning the L^4 Norms of Typical Eigenfunctions on Compact Surfaces

Christopher D. Sogge, Steve Zelditch **407**

1 Introduction 407

2 L^4 Norms of Generic Eigenfunctions 411

3 Average L^4 Norms of Spherical Harmonics 418

4 L^4 Norms of Orthonormal Bases of Spherical Harmonics 419

5 Random Orthonormal Bases of Spherical Harmonics 419

6 Other Orthonormal Bases 421

References 421

Analysis on Riemannian Manifolds with Non-convex Boundary

Feng-Yu Wang **425**

1 Introduction 425

2 Semigroup Properties for Curvature and Second Fundamental Form 426

3 Dimension-free Harnack Inequalities 428

4 Functional Inequalities 431

References 437

The Unity of p -harmonic Geometry

Shihshu Walter Wei **439**

1 Introduction 439

2 A Perspective of p -harmonic Maps 442

3 p -Harmonic Maps and Cohomology Groups 455

4	Unified Notions of F -harmonic Maps	457
5	Unified Notions of F -Yang-Mills Fields	458
6	Vector Bundle Valued p -forms on Riemannian Manifolds: A Higher Level of Generalization	460
7	Manifolds with the Global Doubling Property in p -harmonic Geometry	464
8	Generalized 1-harmonic Equations and Geometric Flows	465
9	The Mean Curvature Flow	470
10	Generalized Constant Mean Curvature Type Equations for Differential Forms	472
11	Geometric Inequalities on Manifolds	473
12	Harmonic Maps in Finsler Geometry	476
	References	476
 Hermitian Harmonic Maps Between Almost Hermitian Manifolds		
	<i>Xi Zhang</i>	485
1	Introduction	485
2	Preliminary Results	486
3	Proof of Theorem 1.1	490
	References	492
 A Global Mean Value Inequality for Plurisubharmonic Functions on a Compact Kähler Manifold		
	<i>Xiaohua Zhu</i>	495
1	Introduction	495
2	Relative Capacity and L^∞ -estimate	497
3	Proof of Theorem 1.1	500
4	A Discussion on Theorem 1.1	504
	References	506
 A List of Publications by Professor Zhengguo Bai		
		509
 A List of Publications by Professor Yibing Shen		
		511
 A List of Graduate Students of Professors Bai and Shen		
		517