
Index

- Almost complex structure, 225
 - integrable, 225
- Almost symplectic structure, 225
 - integrable, 225
- Ampleness criterion, 323

- Balanced path, 308
- Boardman formula, 111
- $bs F$, 13

- Canonical symplectic structure (form)
 - on \mathbb{R}^{2n} , 226
 - on a cotangent bundle, 227
- Capacious Lie subgroup, 289
- Characteristic foliation, 226
- $Clo_a \mathcal{R}$, 246
- Compatible complex and symplectic structures, 223
- Complex
 - manifold, 225, 226
 - structure, 221
 - subspace, 222
 - vector space, 221
- $Conn_y \Omega$, 304
- Contact
 - cutting-off, 243
 - distribution, 232
 - form, 232
 - Hamiltonian, 242
 - manifold, 232
 - monomorphism, 237
 - structure, 5, 232
 - cooriented, 233
 - overtwisted, 254
 - vector field, 242
- Contact structures
 - formally homotopic, 253
 - homotopic, 253
 - isotopic, 253
- Contactization, 234
- Contactomorphisms, 232
- Convex integration, xvi
 - iterated, 318
 - one-dimensional, 305
 - parametric, 311
- $Conv_F \mathcal{R}$, 305
- $Conv \mathcal{R}$, 305
- Coordinate principal subspace, 317, 321
- Core, 51
- CR-structure, 226
- $CS(\xi)$, 233
- $CS(\xi_+)$, 233
- Cusp, 111
 - creation surgery, 162
 - elimination surgery, 162
 - sharp, 171

- Darboux contact form, 232
- Darboux's chart, 226
- $d_g(f, \tilde{f})$, 344
- Diffeotopy, 27
 - δ -small, 27
- Differential condition, 69
- Differential inclusion, 304
- Differential relation, xv, 69
 - Diff V -invariant, 85

- \mathfrak{A} -invariant, 289
- k -flexible, 282
- k -microflexible, 281, 282
- affine ample, 326
- ample, 304, 321
- ample in the coordinate directions, 317
- closed, 71
- determined, xv, 71
- fibered, 79
- fiberwise path-connected, 305
- locally integrable, 279, 280
- microflexible, 282
- open, 71
- overdetermined, 71
- underdetermined, xv, 71
- Distribution, 56
 - integrable, 96
 - involutive, 96
- Embedding
 - ε -Lagrangian, 4
 - co-real, 328
 - contact, 272
 - directed, 326
 - isocontact, 272
 - isosymplectic, 259
 - Lagrangian, 4
 - real, 3, 328
 - symplectic, 259
- Embryo, 129
- Engel structure, 5
- Epimorphism, 70
- Exact
 - Lagrangian immersion, 240
 - Lagrangian submanifold, 240
 - symplectic manifold, 296
- Exa \mathcal{R} , 248
- Exit to infinity, 50
- Family of sections, 10
 - continuous, 10
 - smooth, 10
- Fiber bundle, 9
- Fibration, 9
 - trivial, 9
- FLIF, 196
 - balanced, 203
 - framed, 196
 - holonomic, 196
 - locally, 196
 - stabilization of, 204
- Flower, 307
 - abstract, 306
 - fibered, 312
- Fold, 111
 - sharp, 171
 - sharpening, 190
 - smoothing, 190
 - with respect to a foliation, 114
- Foliation, 41, 95
 - concordance, 98
 - integrable homotopy, 98
- Formal inverse, 332
- Formal primitive, 57
- Framed
 - FLIF, 196
 - Igusa function, 195
- GF, Gdf , 48
- $Gr_n W$, 48
- h -principle for folded solutions, 165
- Haefliger structure, 99
 - augmented, 101
- Hamiltonian function, 241
 - time dependent, 241
- Hamiltonian isotopy, 241
- Hermitian structure, 223, 225
 - integrable, 225
- $\mathcal{H}(L)$, 223
- Holonomic \mathcal{R} -approximation, 283
- Holonomic approximation, 25
 - multivalued, 63
- Hol $X^{(r)}$, 13
- Homotopy
 - holonomic, 13
 - regular, 1, 46
 - tangential, 48
- Homotopy principle (h -principle), xv, 3, 76
 - C^0 -dense, 79
 - (multi) parametric, 78
 - fibered, 80
 - foliated, 102
 - for
 - C^1 -isometric immersions, 342
 - \mathcal{D} -sections, 332
 - ample differential relations, 321
 - ample differential relations over a cube, 320
 - contact structures on open manifolds, 248
 - directed embeddings, 326

- divergence free vector fields, 334
- immersions transverse to contact structure, 287
- immersions transverse to distribution, 91
- isocontact embeddings, 272
- isocontact immersions, 293
- isosymplectic embeddings, 261
- isosymplectic immersions, 298
- Lagrangian immersions, 296
- Legendrian immersions, 294
- linearly independent \mathcal{D} -sections, 334
- maps transverse to contact structure, 286
- maximally nondegenerate two-forms on odd-dimensional manifolds, 250, 337
- microflexible Diff V -invariant relations, 283
- microflexible \mathfrak{A} -invariant relations, 290
- nonintegrable hyperplane distributions on even-dimensional manifolds, 288, 338
- nonvanishing \mathcal{D} -sections, 333
- open Diff V -invariant relations, 85
- real and co-real embeddings, 328
- real and co-real immersions, 326
- sections transverse to distribution, 91
- subcritical isotropic embeddings, 277
- symplectic forms on open manifold, 247
- systems of divergence free vector fields, 336
- systems of exact forms, 336
- local, 78
- one-parametric, 76
- relative, 79
- Smale–Hirsch, 89
- $\mathcal{H}(X)$, 224
- Igusa
 - function, 193
 - leafwise, 193
- Igusa function
 - framed, 195
- Immersion, 1, 46, 70
 - A -directed, 53
 - ε -Lagrangian, 324
 - ε -coisotropic, 324
 - ε -isotropic, 324
 - co-real, 228
 - coisotropic, 228
 - complex, 228, 326
 - contact, 237
 - isocomplex, 228
 - isocontact, 237, 294
 - isometric, 2, 341
 - isosymplectic, 228, 299
 - isotropic, 228, 237
 - Lagrangian, 228
 - Legendrian, 237
 - real, 228, 326
 - subcritical, 237
 - symplectic, 228
- Immersion relation, 70
- Isotopy
 - Hamiltonian, 241
 - Legendrian, 241
- \mathcal{J} , 245
- $\mathcal{J}(L)$, 222
- J_f^r , 10
- $J^r(\mathbb{R}^n, \mathbb{R}^q)$, 10
- $J^r(V, W)$, 12
- $\mathcal{J}(X)$, 224
- k -mersion, 87
- Kähler manifold, 225
- Kähler metric, 225
- $\Lambda^p V$, 56
- Liouville structure, 240
- \mathcal{L}_X , 229
- Manifold
 - almost complex, 225
 - almost Kähler, 225
 - almost symplectic, 225
 - complex, 225, 226
 - contact, 232
 - Hermitian, 225
 - Kähler, 225
 - open, 50
 - symplectic, 225, 226
- Map
 - free, 4
 - short, 341
 - strictly short, 341
 - transverse to a distribution, 91
 - transverse to a stratified set, 19

- transverse to a submanifold, 17
- Microextension trick, 89
- Monomorphism, 48
 - contact, 237
 - isocontact, 237, 295
 - isosymplectic, 260, 299
 - symplectic, 260
- Morin normal form, 119
- Morse
 - function, 113
 - index, 113
 - lemma, 113
- Multifold, 61
- Multisection, 62

- Nash–Kuiper theorem, 342
- Nijenhuis tensor, 225

- $\Omega(t, y)$, 304
- $\mathcal{O}p A$, 11
- Operator
 - formally invertible, 332
 - pure differential, 332

- Petals, 306
- $P^i(z)$, 317
- $p_{\mathcal{J}}$, 223
- Pleating, 191
 - sharp, 187
- Polyhedra, 18
- Positivity condition, 253
- p^r , 11
- p_0^r , 11
- Primitive quadratic form, 343
- Primitive semi-Riemannian metric, 343
- Principal direction, 320
- Principal subspace, 320
- Product of paths
 - uniform, 308
 - weighted, 308
- Projectivization, 236
- p_s^r , 12
- Pseudo-core, 51
- Pseudo-isotopy, 213
- p_S , 223
- $P_{t,y}$, 304

- r-jet, 10, 11
- r-jet extension, 10, 12
- \mathcal{R}_A , 323
- \mathcal{R}_{clo} , 71
- $\mathcal{R}_{\text{coisot}}$, 324
- $\mathcal{R}_{\text{comp}}$, 326
- $\mathcal{R}_{\text{cont}}$, 237
- $\mathcal{R}_{\text{co-real}}$, 326
- $\mathcal{R}_{\text{coisot}}^\varepsilon$, 325
- $\mathcal{R}_{\text{comp}}^\varepsilon$, 326
- Reeb
 - component, 96
 - foliation, 96, 234
 - vector field, 234
- $\mathcal{R}_{\text{isot}}^\varepsilon$, 325
- $\mathcal{R}_{\text{Lag}}^\varepsilon$, 325
- Removal of singularities, xvi
- $r(\tilde{g}, g)$, 344
- \mathcal{R}_{hol} , 282
- Riemannian C^r -manifolds, 341
- Riemannian C^r -metric, 341
- \mathcal{R}_{imm} , 70
- $\mathcal{R}_{\text{imm-trans}}$, 287
- \mathcal{R}_{iso} , 71
- $\mathcal{R}_{\text{isocont}}$, 237
- $\mathcal{R}_{\text{isosymp}}$, 280
- $\mathcal{R}_{\text{isot}}$, 324
- $\mathcal{R}_{k\text{-mers}}$, 318
- \mathcal{R}_{Lag} , 280, 324
- \mathcal{R}_{Leg} , 237
- $\mathcal{R}_{\text{real}}$, 326
- $\mathcal{R}_{\text{subm}}$, 70
- $\mathcal{R}_{\text{sub-isotr}}$, 280
- $\mathcal{R}_{\text{symp}}$, 324
- $\mathcal{R}_{\text{tang}}$, 286
- $\mathcal{R}_{\text{trans}}$, 286

- $\mathbb{S}_{\text{non-deg}}^a$, 250
- $\mathbb{S}_{\text{symp}}^a$, 245
- \mathbb{S}_{cont} , 246
- Section, 9
 - Σ -nonsingular, 71
 - holonomic, 13
 - transverse to a distribution, 91
- $\text{Sec } X^{(r)}$, 13
- Semi-Riemannian metric, 341
- Set
 - m -complete, 55
 - ample, 304
 - stratified, 18
- Sharp
 - cuspidal, 171
 - fold, 171
 - pleating, 187
 - wrinkle, 174
- Short formal solution, 305
- Short path, 303
- $\Sigma^1 r$, 111

- $\Sigma^{i_1, \dots, i_\ell}$, 110
- Σ^k , 18, 109
- $\Sigma^{k,j}$, 109
- Singularity, 71
 - thin, 321
 - thin in the coordinate directions, 318
- Smale's sphere eversion, 46
- Solution, 72, 73
 - r -extended, 72
 - formal, xv, 72, 73
 - genuine, 72
- Space
 - of r -jets, 10
 - of complex structures, 222
 - of symplectic structures, 220
- $\mathbb{S}_{\text{cont}}^+$, 246
- $S^{\perp\omega}$, 220
- $\mathcal{S}_{\text{cont}}$, 246
- $S(L)$, 220
- $\mathcal{S}_{\text{non-deg}}$, 250
- $\mathcal{S}_{\text{cont}}^+$, 246
- $\mathcal{S}_{\text{symp}}$, 245
- $\mathcal{S}(X)$, 224
- $\mathcal{S}_{\text{symp}}$, 245
- Stability theorems, 230, 239
- Standard contact structure on \mathbb{R}^{2n+1} , 232
- Stem, 306
- Stratification, 18
- Submanifold
 - (s, p) , 225
 - almost complex, 225
 - almost symplectic, 225
 - co-isotropic, 225
 - co-real, 225
 - complex, 226
 - isotropic, 225
 - Lagrangian, 225
 - Legendrian, 233
 - subcritical, 233
 - symplectic, 226
 - totally real, 225
- Submersion, 70
- Submersion relation, 70
- Subspace
 - (s, p) , 221
 - co-real, 222
 - coisotropic, 221
 - isotropic, 221
 - Lagrangian, 221
 - symplectic, 221
 - totally real, 222
- Surgery
 - of a pair, 156
 - of singularities, 159
- Symplectic
 - basis, 220
 - cutting-off, 242
 - form, 219
 - manifold, 225, 226
 - orthogonal complement, 220
 - structure, 219
 - subspace, 221
 - twisting, 265
 - vector field, 241
 - vector space, 219
- Symplectic forms
 - formally homotopic, 251
 - homotopic, 251
 - isotopic, 251
- Symplectization, 236
- Symplectomorphism, 226
 - linear, 220
- θ -pair, 281
- Thom Transversality Theorem, 19
- Thom–Boardman singularities, 110
- Transverse subbundles, 56
- Vector bundle
 - complex, 224
 - Hermitian, 224
 - symplectic, 224
- Vector field
 - contact, 242
 - Hamiltonian, 241
 - Liouville, 236
 - Reeb, 234
 - symplectic, 241
- Wrinkle
 - fibred, 128
 - immortal, 190
 - sharp, 174
 - standard, 128
- Wrinkled
 - embedding, 174
 - submersion, 135
 - fibred, 137
- $X^{(r)}$, 11

SELECTED PUBLISHED TITLES IN THIS SERIES

- 239 **K. Cieliebak, Y. Eliashberg, and N. Mishachev**, Introduction to the h -Principle, Second Edition, 2024
- 238 **Julio González-Díaz, Ignacio García-Jurado, and M. Gloria Fiestras-Janeiro**, An Introductory Course on Mathematical Game Theory and Applications, Second Edition, 2023
- 237 **Michael Levitin, Dan Mangoubi, and Iosif Polterovich**, Topics in Spectral Geometry, 2023
- 235 **Bennett Chow**, Ricci Solitons in Low Dimensions, 2023
- 234 **Andrea Ferretti**, Homological Methods in Commutative Algebra, 2023
- 233 **Andrea Ferretti**, Commutative Algebra, 2023
- 232 **Harry Dym**, Linear Algebra in Action, Third Edition, 2023
- 231 **Luís Barreira and Yakov Pesin**, Introduction to Smooth Ergodic Theory, Second Edition, 2023
- 230 **Barbara Kaltenbacher and William Rundell**, Inverse Problems for Fractional Partial Differential Equations, 2023
- 229 **Giovanni Leoni**, A First Course in Fractional Sobolev Spaces, 2023
- 228 **Henk Bruin**, Topological and Ergodic Theory of Symbolic Dynamics, 2022
- 227 **William M. Goldman**, Geometric Structures on Manifolds, 2022
- 226 **Milivoje Lukić**, A First Course in Spectral Theory, 2022
- 225 **Jacob Bedrossian and Vlad Vicol**, The Mathematical Analysis of the Incompressible Euler and Navier-Stokes Equations, 2022
- 224 **Ben Krause**, Discrete Analogues in Harmonic Analysis, 2022
- 223 **Volodymyr Nekrashevych**, Groups and Topological Dynamics, 2022
- 222 **Michael Artin**, Algebraic Geometry, 2022
- 221 **David Damanik and Jake Fillman**, One-Dimensional Ergodic Schrödinger Operators, 2022
- 220 **Isaac Goldbring**, Ultrafilters Throughout Mathematics, 2022
- 219 **Michael Joswig**, Essentials of Tropical Combinatorics, 2021
- 218 **Riccardo Benedetti**, Lectures on Differential Topology, 2021
- 217 **Marius Crainic, Rui Loja Fernandes, and Ioan Mărcuț**, Lectures on Poisson Geometry, 2021
- 216 **Brian Osserman**, A Concise Introduction to Algebraic Varieties, 2021
- 215 **Tai-Ping Liu**, Shock Waves, 2021
- 214 **Ioannis Karatzas and Constantinos Kardaras**, Portfolio Theory and Arbitrage, 2021
- 213 **Hung Vinh Tran**, Hamilton–Jacobi Equations, 2021
- 212 **Marcelo Viana and José M. Espinar**, Differential Equations, 2021
- 211 **Mateusz Michałek and Bernd Sturmfels**, Invitation to Nonlinear Algebra, 2021
- 210 **Bruce E. Sagan**, Combinatorics: The Art of Counting, 2020
- 209 **Jessica S. Purcell**, Hyperbolic Knot Theory, 2020
- 208 **Vicente Muñoz, Ángel González-Prieto, and Juan Ángel Rojo**, Geometry and Topology of Manifolds, 2020
- 207 **Dmitry N. Kozlov**, Organized Collapse: An Introduction to Discrete Morse Theory, 2020
- 206 **Ben Andrews, Bennett Chow, Christine Guenther, and Mat Langford**, Extrinsic Geometric Flows, 2020
- 205 **Mikhail Shubin**, Invitation to Partial Differential Equations, 2020
- 204 **Sarah J. Witherspoon**, Hochschild Cohomology for Algebras, 2019

For a complete list of titles in this series, visit the
AMS Bookstore at www.ams.org/bookstore/gsmseries/.