

Index

NOTE. This is a partial index and the level of coverage varies from article to article. If you don't find your entry here, it doesn't mean it's not in the book! Searchable PDF files for the articles are available at www.msri.org.

- affine invariant, 10, 30
- affinely equivalent metrics, 317
- Akbar-Zadeh's rigidity theorem, 254
- Alexandrov, A. D., 37
- algebraically degenerate, 159
- almost isotropic S -curvature, 320
- almost metric, 269
- (α, β) -metric, 307
- Álvarez Paiva, J. C., 2, 27, 40
- Ambrosio, L., 40
- ample, 85, 89, 110, 149
 - very, 85
- anisotropic mean curvature, 51
- anisotropic mean curvature flow, 51, 64
- anisotropy, 50, 64

- Banach–Mazur compactum, 8
- Banach–Mazur distance, 8, 10, 35
- base locus, 169
- Basic Equation, 221, 224, 226, 228, 229, 236
- Benson volume, 12
- Benson, R. V., 12, 24
- Berck, G., 45
- Berwald metric, 9, 315
- Berwald spaces, 252, 255
- Berwald's formula, 211
 - split and covariantised, 213
- big, 110, 111
- Blaschke–Santaló inequality, 3, 13, 14, 17, 33
- Bolker, E. D., 5, 7
- Bonnet–Myers theorem, 214
- Brody hyperbolic, 107, 191

- broken geodesic, 272
- Brunn–Minkowski theory, 31
- bumpy metric, 278
- bundle
 - ample, 89
 - cotangent, 263
 - Finsler, 89
 - horizontal sub-, 91
 - hyperplane, 88
 - negative, 86
 - parametrized k -jet, 115
 - positive, 86
 - projective, 88
 - projectivized parametrized jet, 139
 - pulled-back, 202–204
 - tangent, 263
 - tautological line, 88
 - vertical sub-, 91
- Burago, D., 2, 21, 27
- Busemann area, 39
- Busemann area definition, 36
- Busemann intersection inequality, 40, 43
- Busemann volume, 10, 16, 17
- Busemann, H., 11, 17, 26–28, 36, 40, 318
- Busemann–Petty problem, 36

- Cahn–Hoffman vector field, 50, 63
- calibration, 22, 27
- canonical connection, 269
- Cartan tensor, 205, 267, 312
- Cartan torsion, 312
- CC(23) Equation, 229, 239
- Chern
 - character, 150

- numbers
 - of $\mathcal{J}_k^m X$, 141
 - of tensor products of bundles, 140
- Christoffel symbols, 314, 334
- Christoffel symbols, formal, 270
- classes of a permutation group, 125
- closed geodesic, 277
- co-disc bundle, 17
- co-Finsler metric, 308
- coarea equality, 44
- coarea formula, 44
- coarea inequality, 44
- coarea inequality for mass*, 44
- Cohn, D. L., 9
- color pattern, 312
- complete linear system, 85
- complex Finsler manifold, 97
- compressing property, 28
- condition, Legendre, 265
- conj_X , 275
- conjugate locus, 275
- conjugate point, 275
 - first, 275
- conjugate radius, 275
- connection, 91
 - canonical, 269
 - Chern, 149, 205–207
 - Finsler, 94
 - Levi-Civita, 269
 - linear, 91
 - nonlinear, 91, 205
- contangent bundle, 263
- convex body, 4
- convex hypersurface, 5
- cotangent bundles, 17
- covariant derivative, 271, 314, 315
- Crofton formula, 27, 164
- cross-polytope, 4, 14
 - maximal inscribed, 12
- crystalline
 - curvature, 51, 73
 - curvature flow, 74
 - mean curvature, 51, 53, 73
 - mean curvature flow, 52, 70, 74, 75
 - norm, 4, 8, 36–39, 65
- cube, 13, 38
- cuboctahedron, 13, 39, 40
- curvature, 94
 - constant flag, 209, 216, 228, 239, 255
 - characterisation, 228
 - navigation description, 239
 - flag, 207–214, 274
 - holomorphic bisectional, 108
 - mixed, 149
 - holomorphic sectional, 97, 107
 - Ricci, 214–217
 - Riemann, 274, 303, 327
 - S, 221, 223, 224, 229, 304, 319
 - scalar, 208, 209
 - sectional, 207, 328
 - spray, 211, 219
 - tensors, 207
- Curvature Equation, 228, 229, 237, 239
- cut locus, 289
- cut point, 289
- CW-complex, 279
- cylinder, right, 13
- ∇^V , 269
 - definition of area, 35
 - degree, 88
 - Deicke, 312
 - derivation, 117
 - derivative
 - covariant, 271
 - Lie, 264
 - destabilizing subsheaf, 143
 - diameter, 288
 - distance, 268, 313
 - symmetrized, 268
 - distinguished section, 204
 - distortion, 319
 - divisor class group, 156
 - divisor, effective, 164
 - double cone, 13
 - double dual space, 6
 - double tangent bundle, 264
 - dual Brunn–Minkowski theory, 12
 - dual definition of volume, 11
 - dual functor, 11
 - dual linear map, 6
 - dual norm, 50, 55
 - dual space, 6
 - duality map, 55, 63
 - Duran, C. E., 17
 - E -curvature, 320
 - E_{23} Equation, 222, 224, 226, 238
 - effective divisor, 164
 - Einstein characterisation, 227
 - Einstein metric, 215–216, 224, 255

- Einstein navigation description, 238
- Einstein rigidity, 217
- ellipsoid
 - maximal inscribed, 12
 - minimal circumscribed, 12
- ε_n Euclidean volume of Euclidean ball, 10
- equiframed curve, 34
- Euclidean norm, 304
- Euclidean space, 305
- Euclidean structure, 4
- Euler stable, semistable, 176
- Euler's theorem, 200, 265
- Ewald, G., 26, 27
- example
 - 3-sphere, 240
 - Bryant's metrics, 209
 - Cartesian products, 246–247
 - Finslerian Poincaré disc, 228, 234, 240
 - Fubini–Study, 249
 - Funk disc, 240
 - Kähler–Einstein, 247–251
 - Matsumoto's slope-of-a-mountain metric, 201
 - Minkowski space, 232
 - Numata metrics, 208
 - paraboloid, 245
 - Ricci-flat, 253
 - Shen's fish pond, 232
 - Shen's fish tank, 241
 - sphere, 245
 - surface of revolution, 244–246
 - torus, 245
 - Zermelo navigation, 201
- exponential map, 286
- extendibly convex, 26

- facet, 52, 57, 68–72
- Fernandes, E., 2, 25, 27, 45
- Finsler bundle, 8, 89
- Finsler manifold, 305
 - area on, 19
 - continuous, 16, 17
 - volume on, 19
- Finsler metric, 9, 32, 89, 118, 149, 199, 265
 - continuous, 16
 - smooth, 20
- Finsler pseudometric, 118
- Finsler space, 40, 44
- Finsler structure, 307
- first conjugate point, 275
- first variational formula, 271
- flag, 207
- flag curvature, 274, 328
- flagpole, 207
- flat, 95, 101
 - conformally, 101
 - projectively, 101
- forgetting map, 115, 118
- form
 - connection, 94
 - curvature, 94
 - torsion, 96
- formal Christoffel symbols, 270
- Fourier transform, 5, 27
- function, reversibility, 266
- fundamental cycle, 151
- fundamental tensor, 200, 202–204
- Fundamental Theorem of Grothendieck, 150
- Funk metric, 306, 311, 346

- Gardner, R. J., 36, 37, 43
- Gauss map, 25
- Gaussian image, 21
- Gaussian measure, 21
- generalized Funk metric, 306
- generalized Koszul formula, 269
- genus, 88
- geodesic, 272, 313
 - broken, 272, 290
 - closed, 277
 - periodic, 277
- geodesic field, 327
- geodesic polygon, 272
- geodesic spray coefficients, 205–207
- geodesic variation, 327
- geodesic vector field, 272
- geometrically ruled, 102
- Gołąb theorem, 39
- Gołąb, S., 30, 39
- Goodey, P., 5
- Grassmannian, 18
 - convexity on, 26
- Gromov mass, 12
- Gromov's mass*, 12
- Gromov, M., 9, 12, 24, 28

- Hölder's inequality, 6
- Hörmander, L., 7, 8, 28
- Haar's theorem, 9

- Hahn–Banach theorem, 19, 29
 Hamiltonian systems, 2
 Hardy–Ramanujan formula, 125
 Harvey, R., 22
 Hausdorff measure, 2, 11, 16, 17, 50, 52, 53, 57, 60
 hexagon, regular, 12
 Hilbert form, 204
 Hitchin–Thorpe inequality, 217
 Hodge manifold, 87
 Holmes, R. D., 2, 11, 39
 Holmes–Thompson area definition, 37
 Holmes–Thompson volume, 2, 11, 16, 17
 homogeneous
 positively, 200, 265
 Hug, D., 39
 hyperbolic
 Kobayashi, 98, 108, 191
 manifold, 88
 hypermetric normed space, 6
 hypermetric space, 5, 14, 27, 28, 37, 38

 I_c , 276
 index, 277
 ind c , 277
 index form, 276
 index of $\mathcal{J}_k^m X$, 147
 index of stability, 140
 indicatrix, 266
 infinitesimal color pattern, 317
 infinitesimal homothety, 236
 injectivity radius, 289
 symmetrized, 289
 integrability condition, 203
 intersection, 12
 intersection body, 2, 35–37, 42, 58
 irregularity, 108
 isometric embedding, 6
 isometric spaces, 8
 isometric submersion, 6
 isometry classes, 8
 isoperimetric problem, 31, 40
 isoperimetrix, 33, 42, 43
 geometry of, 43
 area of, 33
 perimeter of, 33
 isosystolic inequality
 Berger, 2
 Pu, 2
 isotropic E -curvature, 321
 isotropic S -curvature, 320
 Ivanov, S., 2, 21, 27, 40

 J -curvature, 322
 Jacobi field, 274
 Jensen’s Formula, 169
 John’s theorem, 10
 John, F., 8

 k -density, 18, 20
 k -jet differential ω of weight m , 109
 k -volume, 18
 k -volume density, 3, 18, 20, 26
 mass*, 19, 29
 Busemann, 19
 convexity of, 26
 Holmes–Thompson, 19
 mass, 19
 Kirchheim, B., 40
 Klein metric, 305
 Kobayashi conjecture, 139
 Kobayashi hyperbolic, 108, 191
 Kobayashi metric, 98
 Kobayashi pseudometric, 107
 Kodaira–Itaka dimension, 152
 Koszul formula, 269
 generalized, 269

 L -curvature, 322
 \mathcal{L}_W Equation, 236
 ℓ_p space, 4
 λ , 266
 Landsberg curvature, 304, 322
 Landsberg metric, 322
 Landsberg tensor, 207, 212
 Lawson, H. B., 22
 Lebesgue measure, 9
 Legendre condition, 265
 Legendre transform, 7
 Legendre transformation, 265, 308
 length, 313
 Levi-Civita connection, 269
 Lie derivative, 264
 linear covariant derivative, 315
 linear system, 85
 linearly parallel vector field, 315, 321
 Liouville volume, 11, 17
 Lipschitz ϕ -regular, 65, 69
 locally Minkowski, 209
 locus, conjugate, 275
 Loewner ellipsoid, 8

- Loewner theorem, 12
- Loewner, C., 8
- Logarithmic Derivatives Lemma, 164
- logarithmic jet differential, 166
- loop space, 281
- Lutwak, E., 12, 36

- Mahler conjecture, 13, 15
- Mahler inequality, 33
- Mahler's conjecture, 3
- Mahler, K., 14
- Mahler–Reisner inequality, 15
- map, exponential, 286
- Martini, H., 34
- mass, 16
- mass*, 16
- mass* area definition, 38
- Matsumoto identity, 243
- Matsumoto torsion, 312
- maximal set, 125
- McKinney, J. R., 14
- mean Berwald curvature, 321
- mean Cartan tensor, 312
- mean Cartan torsion, 312
- mean curvature, 319
- mean curvature flow, 50, 52, 60, 62
- mean Landsberg curvature, 322
- metric, 269
 - almost, 269
 - bumpy, 278
 - Finsler, 89, 118, 149, 199, 265
 - Fubini–Study, 87
 - Kobayashi, 98
 - Minkowski, 310
 - osculating Riemannian, 273
 - Poincaré, 97
 - pseudo-Kähler, 99
 - Randers, 266
 - Riemannian, 266, 305
- minimizing curve, 313
- Minkowski content, 50, 52, 59, 60
- Minkowski metric, 310
- Minkowski mixed volume inequality, 31, 33, 42
- Minkowski norm, 8, 304
- Minkowski problem, 3, 37
- Minkowski space, 5, 7, 36, 38
- Minkowski sum, 31
- Minkowski theorem, 21
- Minkowski, H., 21, 24, 38
- mixed area, 31
- mixed volume, 31, 32, 41
- Monge–Ampère equation, 149
- monotonicity, 9
- Moustafaev, Z., 34
- μ^{ht} , Holmes–Thompson volume, 11
- μ^b , Busemann volume, 11
- μ^{m*} , Gromov's mass*, 12
- μ^m , Gromov mass, 12
- multiplicity, 275

- nef, 110
- negatively curved, 95
- Nirenberg, L., 38
- nondegenerate, 278
- norm, 3
 - Minkowski, 5, 37, 304
- norm of linear map, 5
- normalized degree, 175
- normalized tuple, 156
- nullity, 277

- octahedron, 13, 38
- of constant flag curvature, 328
- of scalar curvature, 328
- Okada, T., 310
- oriented distance function, 52, 60
- osculating Riemannian metric, 273

- parallel vector field, 315
- parallelogram
 - minimal circumscribed, 22
- parallelogram identity, 4
- parallelootope
 - minimal circumscribed, 12
- partition, 125
- perimeter of unit circle, 30
- periodic geodesic, 277
- ϕ -calibrable facets, 75
- Picard group, 156
- piecewise smooth, 268
- Plücker embedding, 18
- Pogorelov, A. V., 38
- Poincaré–Lelong formula, 164
- point
 - conjugate, 275
 - first conjugate, 275
- polar, 6, 37
- polygon, geodesic, 272
- polytope, 7
- positively homogeneous, 200, 265

- principal curvature, 5
- projection, 12
- projection body, 35, 37, 42
- projection inequality
 - Petty, 40, 43
 - Petty conjectured, 43
- projective factor, 330
- projective Finsler spaces, 2
- projectively flat, 101, 209, 330
- pseudoconvex, 89
 - strictly, 149
- pushforward, 161

- quartic metric, 200

- radius
 - conjugate, 275
 - injectivity, 289
 - symmetrized injectivity, 289
- Radon curve, 34
- Randers metric, 266, 307
 - definition of, 218
- Randers norm, 304
- Rapscák's identity, 210–211
- reduced, 156
- reduction, 156
- regular, 159
- regularity, 200
- Reisner, S., 14
- relatively isotropic J -curvature, 322
- relatively isotropic L -curvature, 322
- reparametrization, 164, 170
- reversibility, 266
- reversibility function, 266
- reversible, 267
- reversible metric, 304
- rhombic dodecahedron, 13, 39, 40
- Ricci Curvature Equation, 222, 224, 226, 237, 238
- Ricci identity, 336
- Ricci rigidity theorem, 253
- Ricci scalar, 214–215
- Ricci tensor, 214–215
- Riemann curvature, 274, 303, 327
- Riemann–Roch
 - for curves, 130
 - formula, 150
 - for jet differentials, 162
- Riemann–Roch theorem, 88
- Riemannian metric, 266, 305
 - osculating, 273
- ruled algebraic surface, 102
- ruled manifold, 102
- ruled, geometrically, 102

- S -curvature, 304, 319
- Schäffer, J. J., 30, 39
- Schneider, R., 2, 5, 31
- Schur lemma, 210, 241
- Schwarz Lemma, 168
 - classical, 165
- sectional curvature, 328
- sheaf
 - destabilizing sub-, 140
 - semistable, 140
- sheaf of germs
 - of k -jet differentials of weight m , 116
 - of k -jet forms, 116
 - of holomorphic k -jets, 114
- Shephard, G. C., 26, 27
- short basis, 12
- short linear map, 5, 35
- σ , 221, 223, 227, 229
- simple k -vector, 18
- simple normal crossings, 166
- simple tangent k -vector, 19
- smooth, piecewise, 268
- spanned, 110, 165
- spray, 314
- spray coefficients, 314
- stable, 175
 - Euler semi-, 176
 - semi-, 175
- star-shaped body, 37
- strong convexity, 200, 255
 - Randers, 218
- strongly convex domain, 310
- subbundle, vertical, 91, 264
- subspace of L_1 , 4
- supporting hyperplane, 28
- surface-area measure, 25
- symmetrized distance, 268
- symmetrized injectivity radius, 289
- symplectic form, 17
- symplectic structure, 11
- symplectic volume, 11, 43

- tangent bundle, 263
 - double, 264
- tangent space, vertical, 264
- tautological section, 91

- Taylor, J., 40
 tensor, Cartan, 267
 theorem, Euler's, 265
 $\vartheta(p, q)$, 289
 θ , 268
 Thompson, A. C., 2, 11, 38–40, 43, 44
 3-d rigidity, 242
 Todd class, 150
 totally convex, 28, 29
 transformation, Legendre, 265

 uniqueness problem for rational and
 meromorphic functions, 136
 unit ball, 4
 volume of, 13

 vanishing theorem, 152
 variational formula, first, 271
 vector field, geodesic, 272
 vertical subbundle, 91, 264
 vertical tangent space, 264
 volume density, 15, 48; *see also* k -volume
 density
 $(n-1)$ -volume density
 mass*, 24
 Busemann, 24
 Holmes–Thompson, 24
 volume form, 32
 volume of submanifold, 16
 volume on continuous Finsler manifold,
 16
 volume product, 11, 13
 volume, definition of, 10

 Wallen, L. J., 34
 Waring problem, 120
 weakly convex, 26, 35
 weakly Landsberg metric, 322
 wedge body, 38, 39, 43
 weight, 153
 weighted projective space, 153
 Weil, W., 5, 27
 Weyl module, 124
 Whitney formula, 139
 Wieacker, J., 2
 Wronskian, 137
 Wulff shape, 35

 Zermelo navigation, 230–234, 238
 example, 201
 Zhang, G., 36
 zonoid, 6, 15, 37
 zonotope, 6