
Index

- Alexandrov Hessian, 154
- barycenter, 179, 181, 212
- barycentric coordinates, 103
- Brenier map, 173
- Cayley transform, 130
- combination
 - affine, 102
 - convex, 102
- comparative convexity, 4
- concave sequence, 39
- conditional expectation, 44
- convex body, 159
- convex cone, 103
- convex sequence, 39
- core point, 210
- derivative
 - directional, 128
 - lower/upper, 27
 - lower/upper second symmetric, 24
 - weak, 227
- doubly stochastic matrix, 54
- dual space, 204
- effective domain, 121
- entropy, 174
- epigraph, 113
- extreme point, 110
- Fischer's minimax principle, 235
- Fischer-information, 174
- formula
 - De Moivre's, 71
 - Euler's, 71, 76, 100
 - Gauss–Legendre duplication, 72
 - Stirling's, 51, 73
 - Taylor's, 143
 - Wallis', 75
 - Weierstrass', 76
- function
 - (ω_1, ω_2) -convex, 99
 - (Fréchet) differentiable, 135
 - (M, N) -convex, 88
 - (M, N) -midpoint convex, 88
 - affine, 7, 112, 165
 - Asplund, 157
 - beta, 74
 - closure, 123
 - coercive, 115
 - completely monotonic, 68
 - concave, 7, 112
 - conjugate, 40, 132
 - convex, 7, 112, 121
 - digamma (Ψ), 85
 - distance, 113
 - distribution, 59
 - (G, A) -convex, 66
 - gamma, 68
 - Gâteaux differentiable, 135
 - gauge, 126
 - increasing, 142
 - indicator, 121
 - integral sine, 84
 - Lagrangian, 146
 - Lipschitz, 23

- Lobachevski's, 84
- log-convex, 66
- logarithmic integral, 83
- lower envelope, 185
- lower semicontinuous, 41, 121
- M_p -convex, 89
- midpoint convex, 10
- monotone, 142
- multiplicatively convex, 66, 119
- n -convex, 25
- nonexpansive, 130
- Orlicz, 43
- piecewise linear, 34
- positively homogeneous, 123
- proper convex, 121
- q -gamma, 98
- quasiconvex, 89, 117
- Schur convex, 199
- semiconvex, 156
- strictly concave, 7
- strictly convex, 7
- subharmonic, 200
- superharmonic, 201
- superquadratic, 61
- support, 126, 134
- symmetric-decreasing rearrangement, 59
- synchronous, 45
- twice Gâteaux differentiable, 142
- upper envelope, 185
- upper semicontinuous, 121
- functional
 - Minkowski's, 126
 - positively homogeneous, 203
 - subadditive, 203
 - sublinear, 203
- Galerkin method, 231
- generic property, 64
- gradient, 135
- half-space, 109
- Hessian matrix, 144
- hull
 - affine, 103
 - convex, 103
- hyperplane, 109
- identity
 - Hlawka's, 100
 - Leibniz–Lagrange, 99
- inequality
 - AM–GM, 11, 45
 - weighted AM–GM, 11
 - Apéry's, 192
 - Bellman's, 189
 - Berezin's, 36
 - Bernoulli's, 19, 170
 - Berwald's, 40, 63, 201
 - Bohnenblust's, 219
 - Borell–Brascamp–Lieb, 160, 176
 - Brunn–Minkowski, 158, 159
 - Carleman's, 49
 - Cauchy–Buniakovski–Schwarz, 16, 28
 - Chebyshev's, 45, 46
 - Clarkson's, 92
 - Favard's, 63
 - Fenchel–Young, 132
 - Fuchs', 96
 - Gauss', 192
 - generalized Jensen–Steffensen, 184
 - geometric-logarithmic-arithmetic mean, 51
 - Hadamard's, 57
 - Hanner's, 127
 - Hardy's, 47, 49
 - Hardy–Littlewood–Pólya, 32, 59, 79, 95, 187
 - Hermite–Hadamard, 5, 50, 82, 198, 200
 - Hlawka's, 100
 - Iyengar's, 63, 191
 - Jensen's, 4, 5, 8, 44, 46, 49, 82
 - Jensen–Steffensen, 33
 - Jordan's, 26
 - Kantorovich's, 29
 - Kimberling's, 81
 - Ky Fan minimax, 118
 - Ky Fan's, 238
 - Lamperti's, 91
 - Lidskii–Wielandt, 238
 - logarithmic Sobolev, 174
 - Lyapunov's, 67
 - Maclaurin's, 213
 - Marcus–Lopes, 220
 - Minkowski's, 17, 20, 125–127
 - mixed arithmetic-geometric, 61
 - Newton's, 214

- Ostrowski's, 63
- Pólya–Knopp, 49
- Pečarić's, 192
- Poincaré's, 227
- Pólya's, 53
- Popoviciu's, 12, 33, 60, 81
- Prékopa–Leindler, 158, 164
- rearrangement, 58
- Rogers–Hölder, 16, 18–20, 127, 170
- Schur's, 56
- Schweitzer's, 29
- Steffensen's, 190
- Szegő's, 189
- Weyl's, 80, 236
- Young's, 14, 15, 170
- infimal convolution, 139
- John–Loewner ellipsoid, 117
- Karush–Kuhn–Tucker conditions, 147, 151
- Laplace transform, 77
- Legendre transform, 40, 132
- lemma
 - Farkas', 149, 151
 - van der Corput's, 26
- Lipschitz constant, 62
- majorization, 53
- maximum principle, 115, 211
- Mazur–Ulam space, 166
- mean, 1
 - arithmetic, 1, 44
 - continuous, 1
 - differential ψ -mean, 5
 - geometric, 1, 45
 - harmonic, 1, 45
 - identric, 2
 - integral φ -mean, 5
 - Lehmer's, 1
 - logarithmic, 2
 - multiplicative, 81
 - power (Hölder's), 1, 14, 48
 - quasi-arithmetic, 3
 - regular, 2
 - Stolarsky's, 2
 - strict, 1
 - symmetric, 1
 - weighted arithmetic, 197
 - weighted geometric, 197
 - weighted identric, 196
 - weighted logarithmic, 196
- measure
 - Borel probability, 206
 - Dirichlet, 197
 - Gauss, 164
 - log-concave, 164
 - M_p -concave, 164
 - normalized, 187
 - Steffensen–Popoviciu, 179
- midpoint, 166
- mollifier, 138
- moment map, 57
- Monge–Ampère equation, 174
- Moreau–Yosida approximation, 139
- Nash equilibrium, 118
- orthogonal projection, 107
- polyhedron, 112
- polytope, 103
- programming problem
 - convex, 145
 - linear, 145
- Raabe integral, 76
- reflexive space, 206
- relative boundary, 105
- relative convexity, 93
- relative interior, 105
- saddle point, 146
- separation
 - of points, 205
 - of sets, 109
- set
 - affine, 101
 - Chebyshev, 108
 - convex, 101
 - extremal, 211
 - of best approximation, 108
 - polar, 112
 - proximal, 108
 - sublevel, 114
- set-valued map
 - cyclically monotone, 134

- maximal monotone, 129
- monotone, 129
- simplex, 103
- singular number, 80
- Slater's condition, 150
- solution
 - classical, 228, 229
 - weak, 229, 230
- subdifferential, 30, 128, 129
- subgradient, 128, 129
- support, 114
- support line, 29
- supporting hyperplane, 110, 113
- T -transformation, 54
- theorem
 - Aczél's, 88
 - Alexandrov's, 154
 - Artin's, 77
 - Banach–Alaoglu, 206
 - basic separation, 110
 - bipolar, 112
 - Birkhoff's, 112
 - Bohr–Møllerup, 69, 98
 - Brouwer's, 118
 - Bunt's, 108
 - Carathéodory's, 103
 - Choquet–Bishop–de Leeuw, 195
 - convex mean value, 36
 - Eberlein–Šmuljan, 206
 - Galvani's, 20, 94
 - Hadamard's three circles, 97
 - Hahn–Banach, 203, 205
 - Hardy's mean value, 97
 - Helly's, 106
 - Hermite–Hadamard, 192
 - Hiriart-Urruty's, 133
 - John's, 117
 - Josephson–Nissenzweig, 138
 - Kirzsbraun's, 130
 - KKM, 118
 - Krein–Milman, 210
 - Lions–Stampacchia, 108
 - Markov's, 151
 - Mazur's, 208
 - Mazur–Ulam, 165
 - Mignot's, 172
 - Minkowski's, 110
 - Montel's, 83
 - Moreau–Rockafellar, 133
 - Popoviciu's, 34
 - Rademacher's, 152
 - Riesz–Kakutani, 181, 206
 - Roselli–Willem, 125
 - separation, 109
 - Stolz, 21
 - strong separation, 109, 209
 - support, 111
 - Tomić–Weyl, 57, 97
 - trace, 227
 - Weierstrass', 114
 - Weyl's perturbation, 236
- uniformly convex space, 96
- variance, 50
- weak topology, 205
- weak-star topology, 205
- Weyl's monotonicity principle, 235