

Index

- G*-invariant vector field, 31
- active contours, 143
 affine invariant, 197
 color, 182
- affine transformation, 7
- arc length, 45
 affine, 8
 Euclidean, 3
 formulas, 139
- B-splines, 20
- back propagation, 195
- Bayes' rule, 251
- boundary conditions, 46
- boundary conditions:Dirichlet, 46
- boundary conditions:Newman, 46
- brightness, 297
- Burger's equation, 49
- calculus of variations, 57
- canonical form, 30
- Cartan, 12
- causality, 101, 260
- central difference, 62
- CFL condition, 67
- chroma, 297
- codimension, 91
 level sets on high, 91
- condition
 entropy, 53
 jump, 53
 Rankine–Hugoniot, 53
- connected components, 327, 328
- connected sets, 327
- conservation form, 49, 79
- conservation law, 49
- contours
 active, 143
- contrast, 307
- cotangent bundle, 25
- cotangent space, 25
- curvature, 3, 138, 139
 affine, 9
 Euclidean, 4
 formulas, 139
 Gaussian, 19
 geodesic, 19
 mean, 19
 space, 16
- curvature motion
 projected, 279
- curve, 2
 closed, 2
 generating, 17
 invariant parameterization,
 45
 representation, 5
 space, 15
- data
 nonflat, 284
- deconvolution, 357
- derivatives
 backward, 62
 central, 62
 forward, 62
- differential geometry
 affine, 7
 planar, 2
- differential invariants
 definition, 42

- differential invariants
 - theory, 23
- differential operator, 44
- diffusion
 - affine invariant, 243
 - anisotropic, 223
 - directional, 241
 - edge stopping, 223
 - isotropic, 222
 - multivalued images, 267
 - vector probability, 298
- Dijkstra algorithm, 83
- dilation, 94
- Dirac delta, 92
- directions, 284
- discontinuity
 - contact, 53
- distance
 - affine, 11
- edges
 - vector valued, 184
- embedding function, 75
- equalization, 310
- equation
 - Hamilton–Jacobi, 84
 - Laplace, 221
 - Poisson, 45, 191
- equations
 - Frenet, 4
 - Hamilton–Jacobi, 55
- erosion, 94
- error
 - local truncation, 65
 - numerical approximation, 64
- evolute
 - Euclidean, 6
- evolution
 - curve, 71
 - surface, 71
- explicit, 62
- Fermats’ principle, 148
- filtering
 - Gaussian, 221
 - median, 246
 - vector median, 271
- finite differences, 61
- finite elements, 61
- flow
 - area preserving, 133
 - constant velocity, 99
 - histogram, 311
 - volume preserving, 133
- fundamental form
 - first, 17, 185
 - second, 19, 289
- Gaussian filtering, 101
- geodesic
 - minimal, 191
- geodesic active contour, 155
- geodesic active regions, 205
- geodesic flow, 151
- geodesics, 144
- gradient
 - affine invariant, 197
- gradient descent, 57
- gradient descent flows, 60
- group
 - (full) affine, 27
 - arc length, 134
 - connected Lie, 36
 - discrete Galois, 25
 - Euclidean, 27
 - Euclidean motions, 27
 - general linear, 25
 - global isotropy, 44
 - infinitesimal generator, 33
 - Lie (definition), 25
 - local Lie, 25
 - matrix Lie, 25
 - metric, 134
 - normal, 135
 - orbit, 29
 - order of stabilization, 43
 - orthogonal, 25
 - projective, 27, 135
 - proper affine motions, 27
 - representation, 28
 - rotation, 26
 - similarity, 27, 141
 - special affine, 27
 - special linear, 25
 - special orthogonal, 25
 - symmetry, 35
 - transitive action, 29
- group of transformations, 26
- groups
 - Lie, 22

- Hüygens principle, 96
- harmonic energy, 288
- harmonic functions, 48, 288
- harmonic maps, 287, 288
- Hausdorff metric, 115
- heat flow
 - affine geometric, 105
 - Euclidean geometric, 102
 - linear, 101, 221
 - similarity, 141
- Hessian, 339
- histogram, 307
 - local, 326
 - Lyapunov functional for, 315
 - shape preserving, 326
- Huber's minimax, 231
- hyperplane, 299
- images
 - vector valued, 182
- implicit, 5, 63
- infinitesimal generator, 33
- infinitesimal invariance, 34
- inpainting, 343
- interpolation, 338
- invariant, 7
 - gray-scale shift, 340
 - linear gray scale, 340
 - morphological, 260
 - relative, 7
 - rotation, 340
 - zoom, 340
- invariant (definition), 30
- invariants
 - affine, 9
- isoperimetric inequality
 - affine, 10
- Jacobi identity, 32
- jet space (bundle), 38
- Kronecker symbol, 24
- Lagrangian approximation, 74
- Lambertian shading rule, 355
- Laplace equation, 45
- Laplace-Beltrami, 289
- Laplacian, 59
- length
 - affine, 201
- level-set, 5
- level-sets, 74
- Lie, 22
- Lie algebra, 31
- Lie bracket, 32
- Lie group, 25
- line processes, 235
- linear fractional, 26
- liquid crystals, 287
- local contrast change, 328
- local methods, 81
- local representative, 329
- Lorentzian, 227
- Möbius transformation, 26
- manifolds
 - nonflat, 284
- MAP classification, 248
- Markov random fields, 250
- matrix with trace 0, 32
- Maupertuis' principle, 146
- Maurer–Cartan form, 33
- maximal change
 - direction of, 185
- maximum principle, 47
- median absolute deviation, 231
- mesh width, 61
- method of characteristics, 34
- metric
 - group, 134
- minimal change
 - direction of, 185
- morphing, 210
- morphological operations, 95
- morphological structuring element, 94
- moving frames, 12
- MRF, 250
- multivalued images
 - level sets of, 190
- narrow band, 81
- narrow-band methods, 81
- norm
 - affine, 201
- normal
 - affine, 8
 - Euclidean, 4
- numerical method
 - consistent, 66
 - consistent of order p , 66

- numerical method (*Cont.*)
 - convergent, 64
 - stable, 66
- numerical methods
 - Eulerian, 76
 - upwind, 68
- numerical scheme
 - monotone, 80
- numerical schemes
 - local, 81
- numerical techniques
 - fast, 83
- one-form, 24
 - invariant, 33
 - pullback, 33
- optical flow, 296
- orbit of group, 29
- orientation, 285
- outliers, 223, 226
- p -harmonic maps, 288
- partial differential equations
 - elliptic, 45
 - hyperbolic, 45
 - parabolic, 45
- perimeter
 - affine, 10
- Poisson equation, 45, 191
- posterior probability, 248
- principle
 - comparison, 340
 - regularity, 340
 - stability, 340
- prior, 248
- prolongation, 39
 - formula, 41
 - vector field, 41
- pullback of one-form, 33
- quadratic, 227
- quotient space M/G , 30
- redescending influence, 228
- reducible representation, 28
- regular group action, 29
- regularity, 260
- relaxation labeling, 250
- representation, 28
 - irreducible, 28
 - representations
 - implicit, 74
 - level sets, 74
 - Riemann problem, 54
 - right-invariant vector field, 32
 - robust statistics, 223
 - rotated gradient directions, 297
- scale space, 221
- self-snakes, 262
 - color, 281
- semidirect product, 27
- semigroup property, 101
- semiregular group action, 29
- shape from shading, 355
- shape offsetting, 153
- shock, 53
- shortening flow
 - Euclidean, 104
- snakes, 143
 - color, 182
- solution
 - weak, 52
- solutions
 - self-similar, 54
 - viscosity, 55, 157, 170
- stereo, 215
- structuring element
 - flat, 95
- subgroup
 - Lie, 25
- subsolution
 - viscosity, 56
- supersolution
 - viscosity, 57
- support function, 128, 132
- surface of revolution, 17
- surfaces
 - implicit, 289
 - minimal, 165, 167
 - regular, 17
 - triangulated, 288
- symmetry group, 35
- tangent
 - affine, 8
 - Euclidean, 4
- tangent bundle, 23
- tangent space, 23

Cambridge University Press

978-0-521-68507-8 - Geometric Partial Differential Equations and Image Analysis

Guillermo Sapiro

Index

[More information](#)*Index*

385

- tangent vector, 23
 - derivational notation, 23
- tension, 16
- time of arrival, 84
- time step, 61
- total derivative, 40
- total variation, 234
- tracking, 87, 208
- Tukey's biweight, 230
- TV, 234
- variational derivative, 140
- vector field, 23
 - prolongation, 41
- viscosity, 54
- wave
 - expansion, 54
 - rarefaction, 54
- wave equation, 45
- wavelets, 264