

Index

- Alexandrov's theorem, 118, 133–135, 140
- algorithm, 140
- complexity, 149
 - map folding, 70
 - polygon folding, 133, 140
 - unfolding orthogonal polyhedron, 145
- amino acid, 40–42, 149
- angle bisector, 77
- annulus, 5, 14, 147
- Archimedean solids, 101, 104, 145, 147, 150
- array, 120
- chain
- alignment, 44, 45
 - locked, 53, 54
 - near-unit, 53, 54, 158
 - piercing, 46, 143
 - unit 90° , 42, 44, 47, 51, 54
- configuration, 147
- degenerate, 148
 - locked, 53, 158
 - maxspan, 42–44
 - piercing, 46
 - of robot arm, 8
 - of shopping bag, 94, 147
 - space, 53, 147
 - staircase, 43, 44
- convex hull, 112, 114
- convexity, 105
- degree
- angle measure, 147
 - number of incident creases, 61, 89, 148
- degrees of freedom, 22, 148
- dihedral angle, 39–41, 89, 90, 148, 163
- dissection, 96, 148
- hinged, 96–98, 145
- edge
- of drawing, 73
 - of polyhedron, 103
 - reflex, 106
 - unfolding, *see* unfolding, edge
- ellipse, 38
- face
- of polyhedron, 81, 83, 100, 103, 149
 - in rigid origami, 84
- folding
- flat, 57, 58
 - a map, 69, 70
 - stamps, 71, 160
- Folding@Home, 52
- induction hypothesis, 7
- joint, 8, 148, 150
- angle, 15, 17, 18
 - fixed-angle, 39
 - kinked, 18
 - pinned, 25, 148
 - universal, 4, 39

- Kawasaki-Justin theorem, 66, 68
 Kempe's universality theorem, 36, 143
- lemniscate, 25
 line segment, 3
 link, rigid, 2, 3, 148
 linkage, 2, 24, 148
 angle-limited, 23, 154, 155
 Chebyshev, 27
 pantograph, 2, 28, 30, 32, 33, 35, 149
 Peaucellier-Lipkin, 27, 28
 planar, 36, 37, 43
 signing, 36, 37
 Watt, 25, 26, 155, 156
 wiper, 29
 locus, 15
- Maekawa-Justin theorem, 61, 63
 map, 69, 70
 mathematical model, 3
 matrix, 120
 maxspan, 42, 143
 Melencolia I, 101, 102, 106, 165
 Miura map fold, 85–87, 144
- necessary and sufficient, 65, 69, 148
 net, 101, 106, 115, 126, 148, 149
 for cube, 112, 116
 general, 115, 117, 119, 125, 126, 129, 149
 Latin cross, 109, 130, 131, 138, 139
 NP-complete, 21, 68, 142, 149
 NP-hard, 68, 149
- one-cut, fold and, 72, 78, 81
 open problem
 Planar Signing (General Case), 37
 Planar Signing Digits, 37
 Dürer's Problem, 106
 Edge-Unfolding Prisms, 115
 Unfolding Manhattan Towers, 126
 General Unfolding, 129
 Locked Unit 90°-Chain, 54
 Map Folding, 70
 Flattening Polyhedra, 83
 Folding to Convex Polyhedra, 139
 origami fold, 57–61, 67, 70, 76, 149
 mountain/valley fold, 50, 57, 149
- pantograph, *see* linkages, pantograph
 Platonic solids, 104, 105, 149, 150
 polygon, 63, 103, 130, 140, 149
 convex, 105, 112, 135
 doubly covered, 134
 regular, 149, 150
 unfoldable, 132
 polygonal chain, *see* chain
 polygraph, 33, 34
 polyhedron, 81–83, 103, 104, 141, 149
 convex, 105, 106, 108, 134, 136
 Dürer's, 101, 106
 deltahedron, 114
 dome, 113
 flattening, 81–83
 Manhattan tower, 125, 126
 orthogonal, 119, 126
 orthogonal terrain, 120, 121, 125
 prism, 112, 113, 115
 prismatoid, 114, 115
 prismoid, 113
 regular, 104, 149, 150
 semiregular, 147, 150
 skeleton, 109, 110
 pop-up spinner, 48, 49
 proof, xi
 constructive, 36, 140, 141
 existence, 134, 140
 induction, 4, 6, 46
 sketch, xi
- protein
 backbone, 23, 40–42, 149
 folding problem, 41, 52
 villin headpiece, 41, 53
 PSPACE-complete, 22, 149
- reachability, 22
 angles, 15, 16, 18
 region, 4, 5, 8, 14
 rhombus, 27, 150, 165
 rigid origami, 84, 85, 88, 89, 144
 robot arm, 3, 4
 ruler folding, 20, 21
- shortest path, 115–117, 167
 skeleton
 of polyhedron, 109
 straight, 79, 80

Cambridge University Press

978-0-521-14547-3 - How to Fold It: The Mathematics of Linkages, Origami, and Polyhedra

Joseph O'Rourke

Index

[More information](#)**Index****177**

- span, maximum, 42, 143
- spherical shell, 5, 19, 147
- square twist, 88, 89

- torus, 103, 129, 169
- tree, 110, 150, 166
 - spanning, 110–112, 166
- triangle inequality, 12, 13, 45, 150, 151
- truncation, 106, 150
- Turk, The, 33, 35, 143

- unfolding
 - edge, 101, 106, 126, 128, 148, 149
 - general, 115, 119, 129, 148
 - grid, 125, 126
 - overlapping, 107, 108
 - petal, 113, 114
 - star, 116, 117
 - unsolved problem, *see* open problem

- vector, 9, 30, 62
 - addition commutative, 8, 11, 147
- vertex, 150
 - of polygonal chain, 8
 - convex, 105, 135
 - origami, 58–60, 147
 - of polyhedron, 103, 132
 - reflex, 105, 132