

Index

- Abel-Jacobi mapping, 11, 38, 85, 87, 88, 116
- Abelian function, 1, 6, 10, 112
- Abelian variety, 1, 6, 9, 10, 12, 50, 57, 63, 64, 68, 75, 86, 115, 124–127
- action coordinates, 5, 13
- adjoint action, 17, 18, 70, 92, 93, 96, 97
- affine structure, 5, 6, 8, 22, 24
- AKS theorem, 4, 8, 12, 20, 33, 61, 63, 79, 98, 100, 101, 102, 104, 108, 111
- angle coordinates, 5, 8
- angular momentum, 16, 41
- angular velocity, 16
- anharmonic oscillator, 5
- Arnold-Liouville theorem, 5, 6, 22
- azimuth, 31
- bifurcations of Liouville tori, 1, 10, 42, 50, 51, 59, 60, 76
- Birkhoff theorem, 112
- Calogero system, 4
- Calogero-Moser system, 4
- Calogero-Sutherland system, 4
- Casimir function, 2, 4, 18, 44, 70, 95–97, 99
- centre-centre point, 43
- Clebsch rigid body, 4
- coadjoint action, 4, 92, 94, 94, 94–97, 100, 102
- coadjoint orbit, 65, 79, 92, 94–97, 99–101
- cooking recipe, 63
- critical level, 6, 10, 22, 25, 39, 41–44, 57, 58, 74, 88
- curve
 affine, 34, 72, 104, 114, 115, 128
 complex, 7, 12, 23, 31, 36–41, 114, 115
 elliptic, 12, 22–24, 28, 29, 34, 38, 46, 63, 67, 71, 73, 75, 113, 116, 122, 123, 125, 127, 129
 hyperelliptic, 1, 48, 49, 54, 72, 73, 80, 83, 115, 127
 real, 12, 38, 88, 113, 118, 119, 121–123
- dimension- n rigid body, 4
- divisor, 13, 34, 35, 37, 38, 54, 56, 67, 73, 80, 83–89, 104, 108, 110, 115, 116, 116, 117–119, 121, 123–128
 canonical, 118
 effective, 56, 83, 84, 116
 general, 83–86, 118
 linear equivalence of, 13, 36, 116, 119, 128
- eigenvector bundle, 8, 34–37, 55, 56, 67, 80, 84, 105, 110, 111, 113
- eigenvector mapping, 8–12, 34, 36, 39, 50, 55, 57, 63, 64, 67, 69, 73–75, 80, 83–86, 89, 104–106, 109, 111, 113, 125
- elliptic function, 1, 6, 11, 65
- Euler angles, 31
- Euler equations, 4, 10, 16, 17, 65, 66
- Euler-Poincaré top, 4, 11, 19, 21, 25
- Euler-Poisson equations, 17
- exotic $SO(4)$ -top, 4, 62, 71
- factorisation problem, *see* Riemann problem
- first integral, 2–4, 7–10, 12, 17–20, 22, 33, 34, 36, 44, 45, 55, 61, 69–71, 78, 79, 81, 82, 100–102, 104, 108, 113

- focus-focus point, 43
 free particle on an ellipsoid, 4, 9, 30, 73, 124
 fundamental vector field, 19, 93, 94–96
 Garnier system, 4
 Gaudin system, 4
 geodesic flow, 4, 9, 30, 73, 124
 geodesics on an ellipsoid, 4, 9, 30, 73, 124
 Goldman functions, 4
 Goryachev-Chaplygin top, 4, 12, 20, 63, 64
 Grothendieck-Riemann-Roch theorem, *see* Riemann-Roch theorem
 Hénon-Heiles system, 4, 124
 Hamilton equations, *see* Hamiltonian system
 Hamiltonian Hopf bifurcation, 43
 Hamiltonian system, 2, 11, 12, 17, 18, 22, 33, 50, 61, 71, 79, 81, 98, 100–102, 104, 110, 112, 113
 Hamiltonian vector field, 2, 10, 19, 22, 29, 57, 73, 80, 95, 98, 101, 113
 harmonic oscillator, 4
 Heisenberg group, 97
 Holt potential, 4
 inertia matrix, 16, 19, 21, 27, 33, 62
 integrable system, 1–3, 5, 6, 8–10, 12, 13, 18, 32, 43, 63, 65, 78, 81, 92, 96, 101, 108, 124
 intersection of quadrics, 12, 22, 67, 71
 involution theorem, 54, 70, 98, 99, 100, 112
 isospectral deformations, 33, 89, 104, 110
 Jacobi identity, 2, 3, 91–93, 95, 98
 Jacobi matrix, 78, 89, 102
 Jacobian variety, 10–12, 36, 37, 46, 48, 50, 55, 64, 69, 86–89, 110, 113, 114, 115, 116, 118, 119, 122, 123, 127, 129
 generalised, 34, 36, 58
 Jeffrey-Weitsman system, 4
 Kepler problem, 4
 Kirchhoff rigid body, 4
 Kolossoff potential, 5
 Kowalevski top, 1, 5, 9, 11–13, 19–21, 45, 50, 58, 59, 62, 63, 76, 129
 Kowalevski-Painlevé analysis, 21, 113
 Lagrange momentum, 19, 29
 Lagrange top, 5, 11, 12, 16, 19, 21, 27, 29, 32, 42, 62, 63
 Lagrangian subspace, 5
 Laurent tail, 108–110
 Lax equation, 6–11, 13, 32, 33, 37, 44, 45, 50, 52, 60, 62–66, 77, 78, 82, 103, 104, 108, 110, 113, 118
 Leibniz rule, 2, 3, 91
 Lie algebra, 1, 2, 4, 12, 43, 52, 60, 62, 70, 78, 79, 91–93, 96–101, 103, 104, 111, 112
 linearisation
 of flows, 5, 6, 8, 9, 22, 24, 36, 48, 50, 64, 104, 110, 111
 theorems, 6, 9, 12, 36, 50, 110
 Liouville tori, 1, 5, 6, 10, 25, 27, 29, 30, 42, 50, 51, 56, 58–60, 76
 loop algebra, 1, 60
 momentum mapping, 4, 25, 29, 36, 40–42, 44, 57, 58, 61, 73, 74
 Moser system, 5, 44, 73
 Neumann problem, 5, 9
 normalisation, 34, 53, 63, 80, 104, 115, 127, 128
 nutation, 31
 Painlevé analysis, *see* Kowalevski-Painlevé analysis
 particle in a potential field, 5
 pendulum, 5
 period lattice, 13, 24, 31, 48, 68, 69, 88, 115, 119, 120, 122–124
 Pfaffian, 70
 Picard group, 8, 9, 34, 37, 54, 67, 115, 116, 117, 121
 Poisson Lie group, 92
 Poisson structure, 2, 2–4, 8, 11, 12, 19, 20, 29, 43, 60, 61, 70, 79, 80, 91, 92, 94–96, 98–102, 108
 Kirillov structure, 12, 19, 61, 70, 91, 94, 95, 98, 100, 101
 precession, 31

- Prym variety, 9, 10, 12, 54, 56–60, 63, 74–76, 124, 125–127, 129
- real part, 9, 10, 24, 28, 31, 37, 38, 40, 41, 49, 50, 56, 58, 59, 66, 69, 71, 72, 75, 86–89, 113, 118, 119–124
- real structure, 9, 10, 31, 37, 38, 56, 64, 69, 75, 118, 119, 122
- regular level, 5, 6, 9, 12, 22, 25, 29, 30, 36, 37, 40, 41, 43, 50, 56–58, 63, 73, 80, 81, 85, 88, 113
- Riemann problem, 111, 112
- Riemann surface, 114, 115, 118, 129
- Riemann-Hurwitz theorem, 114, 115
- Riemann-Roch theorem, 11, 34, 55, 75, 85, 105, 106, 114–116, 117, 118
- rigid body, 1, 4, 9, 11, 12, 15, 16, 21, 22, 29, 62, 65, 66, 69, 125, 129
 Euler-Arnold, *see* rigid body, free
 free, 4, 9, 11, 12, 21, 22, 29, 62, 65, 66, 125
- R -matrix, 60, 61, 63, 98
- Ruijsenaars system, 5
- Sato Grassmannian, 113
- skyscraper sheaf, 108
- spectral curve, 7, 9–12, 33, 34, 37, 39, 44, 50, 52, 55, 63, 64, 66, 71, 77, 80, 82, 104, 110, 113, 118
- spectral parameter, 7, 10, 11, 65, 66, 112, 113
- spinning top, 1, 2, 4, 6, 9–12, 15, 16, 19, 25, 27–32, 37, 41, 42, 60, 62, 118
 generalised, 60
- Steklov rigid body, 5
- symplectic foliation, 4, 95
- symplectic leaf, 4, 20, 29, 65, 69, 80, 92, 94, 96, 97
- symplectic manifold, 2–5, 9, 18, 20, 22, 29, 43, 60, 65, 69, 80, 81, 92, 94, 96, 97, 103, 104
- symplectic reduction, 29, 61, 62
- Θ -divisor, 10, 85, 113, 117, 126
- ϑ -function, 1, 12, 49, 64, 129
- Toda lattice, 5, 9, 10, 12, 77, 78, 88, 89, 103, 113
- two-body problem, 5
- Weierstrass \wp -function, 13, 31, 123, 124
- Yang-Baxter equation, 98