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Nota di contenuto	Intro -- Preface -- Contents -- Complex Differential Equations and Geometric Structures on Curves -- 1 Calogero's ``Goldfish,'' Complex Differential Equations and Translation Structures -- 1.1 The ``Goldfish'' Many-Body Problem -- 1.2 Differential Equations and Vector Fields -- 1.3 Translation Structures -- 1.4 Completeness and Semicompleteness -- 1.5 A Reduction -- 1.6 Translation Surfaces and Billiards -- 2 Affine Geometry -- 2.1 An Adapted Differential Operator -- 2.2 Uniformization of Triangles According to Schwarz, I -- 2.3 The Monodromy of the Linear Equation -- 2.4 Back to the Translation Surface -- 2.5 The Remaining Settings -- 3 Aside: Some Elliptic Functions -- 4 Projective Geometry -- 4.1 Mobius Transformations -- 4.2 The Equations of Chazy, Halphen and Ramanujan -- 4.3 Halphen's

Invariance Property -- 4.4 The Schwarzian Derivative -- 4.5 Fuchs's Theorem -- 4.6 Schwarz and the Uniformization of Triangles, II -- 4.7 Extending Schwarz's Function -- 4.7.1 If ++1 (Spherical) -- 4.8 The Holonomy Cover -- 4.9 A Replacement for Translation Surfaces -- 4.10 Back to the Equations -- 4.11 Equations with Solutions Defined in More Unusual Domains -- 4.12 A General Construction -- 5 Epilogue -- References -- Blow-Up, Homotopy and Existence for Periodic Solutionsof the Planar Three-Body Problem -- 1 Introduction -- 1.1 My Path Through the Variational Wilderness -- 1.2 Breakthrough -- 2 Background: Equations and Solutions -- 2.1 Equations -- 2.2 Solutions of Euler and Lagrange -- 3 Shape Sphere: Blow-Up and Reduction, First Pass -- 4 Metric Set-Up: McGehee Blow-Up -- 4.1 Metric Reformulation -- 4.2 McGehee Transformation via Energy Balance -- 4.3 Equilibria! -- 4.3.1 The Euler and Lagrange Family: Planar Problems -- 4.3.2 Aside: An Open Problem -- 4.4 Linear and Angular Momentum. 4.5 Center of Mass Frame -- 4.6 Energy-Momentum Level Sets and the Standard Collision Manifold -- 4.7 Aside: Parabolic Infinity -- 5 Quotient by Rotations -- 5.1 Collision Locus -- 5.2 Accounting for Velocities -- 5.2.1 Velocity (Saari) Decomposition -- 5.2.2 Proof of Proposition 2 -- 5.3 Euler-Lagrange Family in Reduced Coordinates -- 6 A Gradient-Like Flow! -- 6.1 Making Moeckel's Manifold with Corner into a Manifold with a T -- 6.2 Finishing Up the Proof of Theorem 1 -- 7 A Conjecture: Non-existence -- 7.1 Hyperbolic Pants -- 7.2 Hanging Out at Infinity -- 7.3 The Bestiary of Danya Rose -- 7.3.1 Coding Gravitational Billiards -- 7.3.2 B-Mode, Unstable: t0 (8, 5) -- 7.3.3 Regularized Shape Sphere and Numerics -- 7.4 Failure of Limits -- References -- A Quick View of Lagrangian Floer Homology -- 1 Introduction -- 2 Morse-Smale Functions -- 3 Morse Homology -- 4 Symplectic Manifolds and Lagrangian Submanifolds -- 5 Symplectic and Hamiltonian Diffeomorphisms -- 6 Lagrangian Floer Homology -- 7 Computation of HF(L,L) -- 8 Applications -- References.

Sommario/riassunto

Presenting a selection of recent developments in geometrical problems inspired by the N-body problem, these lecture notes offer a variety of approaches to study them, ranging from variational to dynamical, while developing new insights, making geometrical and topological detours, and providing historical references. A. Guillot’s notes aim to describe differential equations in the complex domain, motivated by the evolution of N particles moving on the plane subject to the influence of a magnetic field. Guillot studies such differential equations using different geometric structures on complex curves (in the sense of W. Thurston) in order to find isochronicity conditions. R. Montgomery’s notes deal with a version of the planar Newtonian three-body equation. Namely, he investigates the problem of whether every free homotopy class is realized by a periodic geodesic. The solution involves geometry, dynamical systems, and the McGehee blow-up. A novelty of the approach is the use of energy-balance in order to motivate the McGehee transformation. A. Pedroza’s notes provide a brief introduction to Lagrangian Floer homology and its relation to the solution of the Arnol’d conjecture on the minimal number of non-degenerate fixed points of a Hamiltonian diffeomorphism.