

1. Record Nr.	UNINA9910483493103321
Autore	Gustafsson Bjorn <1947->
Titolo	Laplacian growth on branched Riemann surfaces / / Bjo Gustafsson and Yu-Lin Lin
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-69863-7
Descrizione fisica	1 online resource (163 pages) : illustrations
Collana	Lecture Notes in Mathematics ; ; v.2287
Disciplina	532.053
Soggetti	Fluid dynamics Geometric function theory Dinàmica de fluids Teoria geomètrica de funcions Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface -- Contents -- 1 Introduction -- 1.1 General Background -- 1.2 Loss of Univalence, Several Scenarios -- 1.3 On the Construction of a Branched Riemann Surface -- 1.4 Moment Coordinates and the String Equation -- 1.5 Outlooks to Physics -- 1.6 Acknowledgements -- 2 The Polubarinova-Galin and Löwner-Kufarev Equations -- 2.1 Basic Set Up in the Univalent Case -- 2.2 Dynamics and Subordination -- 2.3 The Polubarinova-Galin Versus the Löwner-Kufarev Equation -- 3 Weak Solutions and Balayage -- 3.1 Weak Formulation of the Polubarinova-Galin Equation -- 3.2 Weak Solutions in Terms of Balayage -- 3.3 Inverse Balayage -- 3.4 More General Laplacian Evolutions -- 3.5 Regularity of the Boundary via the Exponential Transform -- 3.6 The Resultant and the Elimination Function -- 4 Weak and Strong Solutions on Riemann Surfaces -- 4.1 Laplacian Growth on Manifolds -- 4.2 Examples -- 4.3 The Riemann Surface Solution Pulled Back to the Unit Disk -- 4.4 Compatibility Between Balayage and Covering Maps -- 5 Global Simply Connected Weak Solutions -- 5.1 Statement of Result, and Two Lemmas -- 5.2 Statement of Conjecture, and Partial Proofs -- 5.3 Discussion -- 6

General Structure of Rational Solutions -- 6.1 Introduction -- 6.2 Direct Approach -- 6.3 Approach via Quadrature Identities -- 7 Examples -- 7.1 Examples: Several Evolutions of a Cardioid -- 7.1.1 The Univalent Solution -- 7.1.2 A Non-univalent Solution of the Polubarinova-Galin Equation -- 7.1.3 A Non-univalent Solution of the Lowner-Kufarev Equation -- 7.1.4 A Solution for the Suction Case -- 7.2 Injection Versus Suction in a Riemann Surface Setting -- 8 Moment Coordinates and the String Equation -- 8.1 The Polubarinova-Galin Equation as a String Equation -- 8.2 The String Equation for Univalent Conformal Maps -- 8.3 Intuition and Physical Interpretation in the Non-univalent Case.  
8.4 An Example -- 8.4.1 General Case -- 8.4.2 First Subcase -- 8.4.3 Second Subcase -- 8.5 Moment Evolutions in Terms of Poisson Brackets -- 9 Hamiltonian Descriptions of General Laplacian Evolutions -- 9.1 Lie Derivatives and Interior Multiplication -- 9.2 Laplacian Evolutions -- 9.3 Schwarz Potentials and Generating Functions -- 9.4 Multitime Hamiltonians -- 10 The String Equation for Some Rational Functions -- 10.1 The String Equation on Quadrature Riemann Surfaces -- 10.2 The String Equation for Polynomials -- 10.3 Evolution of a Third Degree Polynomial with Real Coefficients -- 10.4 An Example by Ullemar -- Glossary -- References -- Index.

---