

Klassische und diskrete Randwertprobleme für analytische Funktionen, Kreispackungen und konforme Geometrie.

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The goal of the project is the study of nonlinear boundary value problems in conformal geometry and circle packing. Special attention is directed to applications in geometric function theory and differential geometry, as well as to constructive methods in circle packing.

The focus is on a systematic study of Riemann-Hilbert-Poincaré problems which are characterized by boundary conditions involving the values of the solutions w and their conformal distortion w' . The class of these so-called conformal RHPPs comprises all Riemann-Hilbert problems and many free boundary value problems in conformal geometry, in particular Beurling-type problems. We investigate existence, uniqueness and properties of solutions of the classical problems and their discrete counterparts, numerical algorithms for computing solutions, and convergence under refinement of the discretization.