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A refined Teichmuller space of bordered surfaces

Consider a Riemann surface biholomorphic to a compact Riemann surface of genus g with n discs removed. By classical results of Bers, the Teichmuller space of surfaces of this type is an open subset of a Banach space. In previous work David Radnell and I showed that the Teichmuller space of a bordered surface can be identified (up to a properly discontinuous group action) with a moduli space of Riemann surfaces which appears in conformal field theory, and originates with Friedan and Shenker, Vafa, and Segal.

We define a refinement of the Teichmuller space of a bordered surface, and prove that this refinement is a Hilbert manifold. This is achieved by combining the above results with work of Takhtajan and Teo on a refinement of the universal Teichmuller space. Joint work with David Radnell (American University of Sharjah) and Wolfgang Staubach (Uppsala University).