

Hyperbolic surfaces, circle maps and geometry of Teichmuller spaces

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Abstract

Given a surface S equipped with a hyperbolic metric, the Teichmuller space $T(S)$ is the set of all possible hyperbolic metrics on S . A point in the Teichmuller space $T(S)$ induces a homeomorphism of the unit circle. We adopt this description of $T(S)$ as a certain space of homeomorphisms of the unit circle. – The unit circle is the boundary at infinity of the hyperbolic plane. We use the hyperbolic geometry invariants, called shears, to parametrize various spaces of circle homeomorphisms. We discuss various geometric objects defined on the Teichmuller space in terms of this parametrization using shears. For example, we give an almost complex structure operator on the shears and the Weil-Petersson symplectic two form; which gives a description of the Weil-Petersson metric in the shear coordinates.

Keywords: hyperbolic metric, Teichmuller space, circle homeomorphism.