This paper explicitly computes Lyapunov exponents and length spectra for all closed orientable hyperbolic genus two surfaces. The starting point is the coordinate system defined by B. Maskit [Proc. Amer. Math. Soc. 127 (1999), no. 12, 3643–3652; MR1616641 (2000b:32031)] for the Teichmüller space of genus two surfaces. The matrices defining the representation of its fundamental group are computed, as well as a fundamental domain. This leads to a boundary map, a single transformation which is orbit equivalent to the action of the fundamental group on the circle-at-infinity. The boundary map determines a Markov partition, which is independent of the geometric structure of the surface. It follows that the topological entropy is thus constant over Teichmüller space.

The paper concludes with explicit formulas for other dynamical invariants, such as the Lyapunov exponents and the zeta function. Formulas for these quantities are expressed in terms of the Fenchel-Nielsen-Maskit coordinates, and some of them are plotted.

Reviewed by William Goldman

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