Teichmüller curves in moduli space, Eisenstein series and an application to triangular billiards.


Summary: “There exists a Teichmüller disc $\Delta_n$ containing the Riemann surface of $y^2 + x^n = 1$, in the genus $[(n - 1)/2]$ Teichmüller space, such that the stabilizer of $\Delta_n$ in the mapping class group has a fundamental domain of finite (Poincaré) volume in $\Delta_n$. Application is given to an asymptotic formula for the length spectrum of the billiard in isosceles triangles with angles $(\pi/n, \pi/n, (n - 2/n)\pi)$ and to the uniform distribution of infinite billiard trajectories in the same triangles.”

Contents: Introduction; The affine group of an $F$-structure; Periodic trajectories and Eisenstein series; $F$-structures associated to primitive roots of unity; Calculation of $\Gamma(u(e(1/n)))$; A residue calculation; Fundamental domain, generators and relations for $\Gamma(u_n)$; Application to billiards; Criterion for $\Gamma(u)$ to contain noncommuting unipotents.

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