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Extremal parameters and their duals for boundary maps associated to Fuchsian groups.

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Summary: We describe arithmetic cross-sections for geodesic flow on compact surfaces of constant negative curvature using generalized Bowen-Series boundary maps, and their natural extensions, associated to co-compact torsion-free Fuchsian groups. If the boundary map parameters are extremal — that is, each is an endpoint of a side of the fundamental polygon — then the natural extension map has a domain with finite rectangular structure, and the associated arithmetic cross-section is parametrized by this set. This construction allows us to represent the geodesic flow as a special flow over a symbolic system of coding sequences. Moreover, each extremal parameter choice has a corresponding dual parameter choice such that the “past” of the arithmetic code of a geodesic is the “future” for the code using the dual parameter. This duality was observed for two classical parameter choices by Adler and Flatto; here we show constructively that every extremal parameter choice has a dual.

MSC:

20H10 Fuchsian groups and their generalizations (group-theoretic aspects)
37B10 Symbolic dynamics
37D40 Dynamical systems of geometric origin and hyperbolicity (geodesic and horocycle flows, etc.)

Full Text: DOI

References:

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