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Teichmüller Theory Seminar

Trajectories on the Platonic Solids

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Abstract

Given any of the 5 Platonic solids, can we find a straight-line trajectory on the surface of the solid that starts and ends at the same vertex without passing through any other vertex? It was proven for the tetrahedron, octahedron, cube, and icosahedron that there is no trajectory from a vertex to itself that does not pass through another vertex. We will give a simple proof of this for the tetrahedron and outline the proof for the other solids. Finally, we will show that there does indeed exist such a trajectory on the dodecahedron, a nd using translation surfaces, we give a complete classification of such trajectories. All of the necessary theory of translation surfaces will be developed and the connection to k-differentials will be mentioned. This is joint with Jayadev S. Athreya and Pat Hooper.

Monday, February 19 2018, 4pm

Smith Hall 204