BI-CO MATHEMATICS COLLOQUIUM

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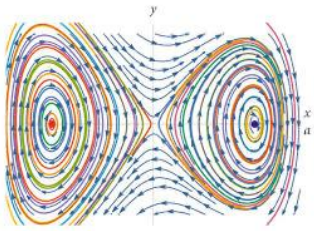
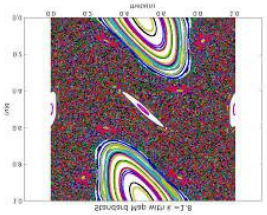
"Examples of Finite Genus Surfaces Embedded in R^3 with Anosov Geodesic Flow"

Monday, March 4, 2024
Talk at 4:15 – Park 245
Tea at 4:00 – Park 361, Math Lounge

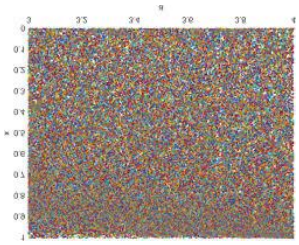
Abstract:
The types of dynamical behavior that can occur in Hamiltonian (i.e. measure preserving systems) range from simple and well-behaved (integrable system) to strongly chaotic (Anosov) with varying levels of "chaoticness" in between.



Regular motion - integrable



Co-existence of regular and chaotic motion



Strongly chaotic motion - Anosov

We show how many of these behaviors can arise from geodesic flows on surfaces. However, some of these surfaces are abstract surfaces that do not exist in three-dimensional Euclidean space. We explore examples of surfaces that exist in three-dimensional space and show that such systems can be strongly chaotic (Anosov). The geometry of our three-dimensional space does not limit chaoticness! We finish by giving an explicit estimate for the genus (# of holes) of these examples.

Surface of genus 4

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