

Elliptic Periodic Orbits in C^2 -Stadia.

Alexander Grigo

The stadium billiard is one of the simplest examples of hyperbolic and ergodic convex billiards. Its existence came as a great surprise because Lazutkin showed in 1973 that strictly convex billiard tables with smooth enough boundary have caustics, hence cannot be ergodic.

When smoothing out the ends of the circular arcs of the usual stadium billiard such that the curvature of the resulting curved segment vanishes at its endpoint one obtains a C^2 -smooth stadium. In this talk we will show that even for an arbitrarily short smoothed out part of the originally circular arcs the resulting billiard flow possess elliptic periodic orbits for arbitrary short and also for arbitrary large separation distances of the two curved segments.

This result therefore shows that the billiard dynamics on a table with focusing boundary components can be dramatically affected by changing the smoothness of the boundary arbitrarily close to just a single point. (This is joint work with L.Bunimovich)