

1087-37-125

Leonid Bunimovich (bunimovh@math.gatech.edu) and **Alexander Grigo***
(grigo@math.ou.edu). *Elliptic periodic orbits in C^2 -smooth stadium billiards.*

The stadium billiard is one of the simplest examples of hyperbolic and ergodic convex billiards. The existence of such billiards 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. We show that even for arbitrarily short smoothed out regions the resulting C^2 -stadium billiard has elliptic periodic orbits for arbitrary short and also for arbitrary large separation distances of the two curved boundary components. (Received December 01, 2012)