

1154-37-470

Vladimir Dragovic*, Department of Mathematical Sciences, 800 W. Campbell Road, FO 35,
Richardson, TX 75080. *Ellipsoidal Billiards and Chebyshev-type polynomials.*

A comprehensive study of periodic trajectories of the billiards within ellipsoids in the d -dimensional Euclidean space is presented. The novelty of the approach is based on a relationship established between the periodic billiard trajectories and the extremal polynomials of the Chebyshev type on the systems of d intervals on the real line. The case study of trajectories of small periods is given. In particular, it is proven that all d -periodic trajectories are contained in a coordinate-hyperplane and that for a given ellipsoid, there is a unique set of caustics which generates $(d + 1)$ -periodic trajectories. A complete catalog of billiard trajectories with small periods is provided for $d = 3$. This is a joint work with Milena Radnovic. (Received September 04, 2019)