

## **On periodic orbits in complex billiards and tangential correspondence**

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A conjecture of Victor Ivrii (1980) says that in every billiard with smooth boundary the set of periodic orbits has measure zero. This conjecture is closely related to spectral theory. Its particular case for triangular orbits was proved by M. Rychlik (1989), Ya. Vorobets (1994) and other mathematicians. The case of quadrilateral orbits in dimension two was treated in our joint work with Yu. Kudryashov (2012). We study the complexified version of planar Ivrii's conjecture with reflections from a collection of planar holomorphic curves. We present the classification of complex counterexamples with four reflections and its real applications. We provide partial positive results. The recent one concerns a billiard on one irreducible algebraic curve satisfying a mild additional condition, e.g., irreducibility of the tangential correspondence.