

Hyperbolicity in dissipative polygonal billiards

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A billiard is a mechanical system consisting of a point-particle moving freely inside a planar region and being reflected off the perimeter of the region according to some reflection law. The specular reflection law is the familiar rule that prescribes the equality of the angles of incidence and reflection. Billiards with this reflection law are conservative systems, and as such are models for physical systems with elastic collisions. For this reason and their intrinsic mathematical interest, conservative billiards have been extensively studied. Much less studied are dissipative billiards, which originate from reflection laws requiring that the angle of reflection is a contraction of the angle of incidence. These billiards do not preserve the Liouville measure, and therefore can model physical systems with non-elastic collisions. We will present the case of polygonal billiard tables, whose dynamics differs strikingly from the one of its conservative counterparts. Joint work with G. del Magno, P. Duarte, J. P. Gaivão and D. Pinheiro.