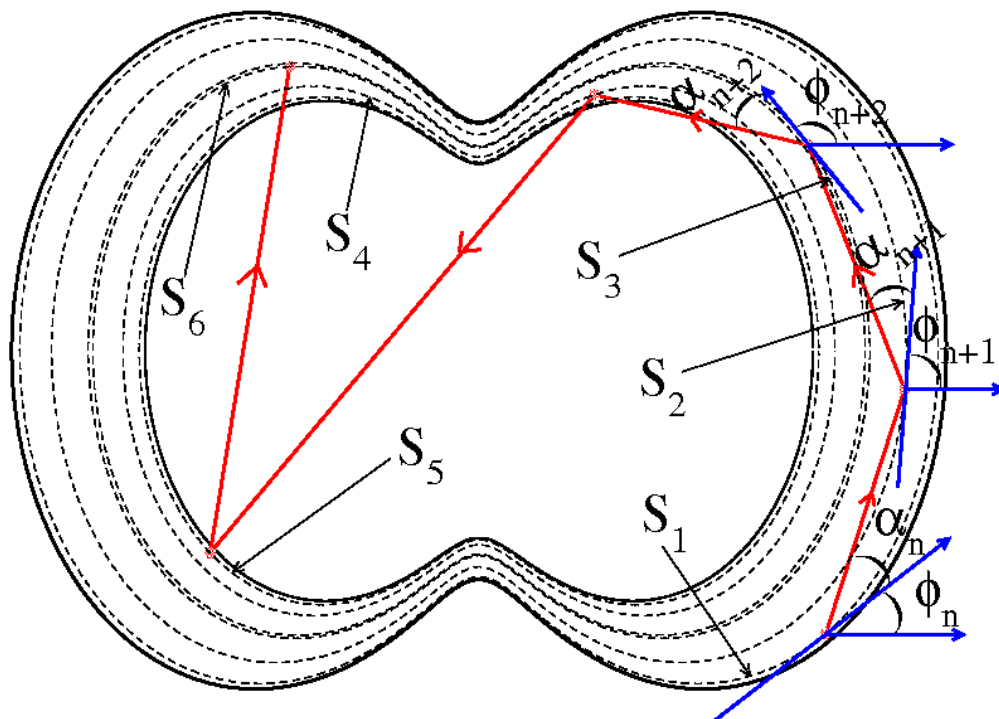


SOME DYNAMICAL PROPERTIES OF TIME-DEPENDENT BILLIARDS

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It is well known that the structure of the phase space depends on the individual characteristics of each system. Here, we consider the two types, namely, one integrable (elliptical billiard) and one mixed (oval billiard). Our main goal is to understand and describe the behaviour of the particle's average velocity (and hence its energy) as a function of the number of collisions considering both, the conservative as well as the dissipative dynamics. For the dissipative case we consider two kinds of dissipation, namely, collisional dissipation and in-flight dissipation. Our results confirm that unlimited energy growth is observed for the non-dissipative case in the two cases. However, when dissipation is introduced via inelastic collisions or in-flight dissipation, the scenario changes and the unlimited energy growth is suppressed, thus leading to a phase transition from unlimited to limited energy growth. The behaviour of the average velocity is described using scaling arguments.