

Mechanical linkages with chaotic dynamics

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A mechanical linkage is a physical system made of rigid rods linked by flexible joints. Some of the joints are fixed to the plane while the others are free. The behavior of the system, when it starts with an initial speed, is given by the geodesic flow on its configuration space endowed with a metric which depends on the choice of masses. In 2003, T J Hunt and R S Mackay gave an example of a linkage with very chaotic dynamics: more precisely, the system is Anosov. It was the first known Anosov physical system.

I will give a new example of linkage, with 5 rods, whose configuration space is close to a chaotic billiard. I will explain how this implies that the geodesic flow has Anosov type, following an idea which was first formulated by Arnold. Thus, we obtain a new Anosov linkage.