
On chaotic dynamics in non-holonomic mechanical systems

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Abstract

We notice three important properties of a typical system of non-holonomic mechanics: such systems are time-reversible, have an energy integral, and the flow in the energy level does not preserve the phase volume. We demonstrate that such systems can be characterised by a peculiar type of chaos, which corresponds to a robust merger of the attractor and the repeller. We discuss basic dynamical constructions which can be behind this phenomenon and show that they can lead to chaos of ultimate diversity and richness. We argue that the effects can persist when a small dissipation and energy pumping are added.

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