

## A Dynamical Systems Analysis of the Overturning of Rigid Blocks

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This work deals with the overturning of a rocking rigid block on an oscillating base. This old and fascinating topic is reconsidered by modern techniques of dynamical systems theory. In particular, it is investigated how the invariant manifolds of hilltop saddles are involved in the toppling. The work is divided in two parts: The first is theoretical and concerns the amplitude threshold for contact between stable manifolds and rest position, while the second is numerical and leads to the definition of the “true” safe basin of attraction and its erosion, which in turn triggers the toppling. One element of novelty is that dynamical systems theory is applied to a single initial condition (the rest position) instead of to the whole dynamics, as customary done. To the authors knowledge, this work is one of the first attempts to make explicit the role played by the invariant manifolds on the overturning, and to provide a theoretical interpretative framework for this important practical phenomenon.

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