

Experiments in non-smooth mechanics

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Abstract

There has been much recent interest in the dynamic behavior of *non-smooth* systems. Such systems may be thought of as severely nonlinear. Bouncing balls, impacting systems, dry friction, and backlash in gears, are all example mechanical systems in which a non-smooth characteristic plays a key role. These systems are capable of exhibiting characteristic behavior not found in smooth dynamical systems, and are often a crucial feature in mechanical wear and tear. The focus in this presentation is on experimental systems. A brief review will be given of non-smooth systems in general, and then we shall take a closer look at more challenging systems including impacting pendulums, pinball machines, rocking blocks and an airfoil with a loose flap.

Biography

Lawrie Virgin is Professor of Mechanical Engineering and Materials Science at Duke University in North Carolina. He is a former Chair of the Department of Civil and Environmental Engineering and has been a faculty member at Duke since 1988. Prior to that he received his education in the United Kingdom culminating in a PhD from the University of London (UCL). His research interests are centered on nonlinear mechanics especially buckling, nonlinear vibration and their interaction. Applications of his research include ship capsizes, aeroelasticity, marine risers, rocking blocks, control, sonic fatigue, solar sails and the dynamics of very slender structures. He is the subject editor for Nonlinear Dynamics for *Journal of Sound and Vibration*. He has written over one hundred and forty journal papers and two books: "Introduction to Experimental Nonlinear Dynamics" (2000) and "Vibration of Axially Loaded Structures" (2007) both published by Cambridge University Press.

