SIGEST

In this section we present "A Stiction Oscillator with Canards: On Piecewise Smooth Nonuniqueness and Its Resolution by Regularizing Using Geometric Singular Perturbation Theory," by Elena Bossolini, Morten Brøns, and Kristian Uldall Kristiansen. This is the highlighted SIGEST version of an article that first appeared in the *SIAM Journal on Applied Dynamical Systems* in 2017. The article focuses on a deceptively simple mechanical model: a rigid block moving on a flat surface. The block is attached to a spring and thereby subjected to harmonic forcing, as illustrated in Figure 1. The novelty lies in the fact that the friction between the block and the surface is modeled as *stiction*, so that the force of friction when the block is sticking can be greater than the force of friction when the block is slipping on the surface.

The model takes the form of a discontinuous ODE system that cannot be understood using Filipov's methodology. The authors shed light on nonuniqueness issues arising at the onset of slip, and introduce the notion of regular and singular stiction solutions. To address uniqueness they consider a regularized model and identify a slow manifold that separates sticking and slipping solutions. Some trajectories, in the form of canards, correspond to a delay in the onset of slipping. The work builds on sophisticated ideas from dynamical systems theory, giving clear explanations of many subtle concepts. High quality graphics and computational experiments are used to illustrate the theory.

In preparing the SIGEST version, the authors have provided additional references to recent work in this field, notably with respect to blow up of solutions and the use of geometric singular perturbation theory to understand how smooth systems approach nonsmooth ones.

The Editors