SIGEST

The SIGEST article in this issue is "Formation of Finite-Time Singularities in the 3D Axisymmetric Euler Equations: A Numerics Guided Study," by Guo Luo and Thomas Y. Hou. This work considers the nonexistence of global finite-energy solutions to the 3D Euler equations. The authors propose a class of potentially singular solutions for the axisymmetric case, and present compelling numerical evidence that finite-time blowup occurs. Their contribution is closely related to the Clay Millennium Prize Problem on existence and smoothness of solutions to the Navier–Stokes equation, and hence sheds light on a preeminent open problem in fluid mechanics.

At the heart of this work is a meticulous set of computational experiments that use customized Galerkin approximations and adaptive meshes in order to track a nearly singular numerical solution with high accuracy. The numerical results are validated with a range of tests, and the behavior close to the putative point of singularity is used to propose asymptotic scalings for various important quantities. The experiments also lead to a relevant 1D reduced model for which a finite-time singularity can be established rigorously.

The original 2014 article, which appeared in SIAM's *Multiscale Modeling and Simulation* journal, has attracted considerable attention. In preparing this SIGEST version, the authors have made numerous modifications and revisions. These include: expanding the introductory section, streamlining and condensing the presentation of the numerical results, and updating the reference list. They have also highlighted various directions in which these equations, first published in 1757 by Leonhard Euler, may continue to tantalize both applied and numerical analysts.

The Editors