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Recent Analytical and Numerical Results for The Navier-Stokes-Voigt Model and Related Models ADAM LARIOS, University of California Irvine, Los Alamos National Lab, EDRISS TITI, University of California Irvine, Weizmann Institute of Science, MARK PETERSEN, BETH WINGATE, Los Alamos National Lab — The equations which govern the motions of fluids are notoriously difficult to handle both mathematically and computationally. Recently, a new approach to these equations, known as the Voigt-regularization, has been investigated as both a numerical and analytical regularization for the 3D Navier-Stokes equations, the Euler equations, and related fluid models. This inviscid regularization is related to the alpha-models of turbulent flow; however, it overcomes many of the problems present in those models. I will discuss recent work on the Voigt-regularization, as well as a new criterion for the finite-time blow-up of the Euler equations based on their Voigt-regularization. Time permitting, I will discuss some numerical results, as well as applications of this technique to the Magnetohydrodynamic (MHD) equations and various equations of ocean dynamics.

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