1096-35-1675 **Eitan Tadmor***, Ctr for Scientific Computation and Math Model, CSCAMM, CSIC Bldg. #406, University of Maryland, College Park, MD 20742. *On variational formulation of entropy solutions to nonlinear conservation laws.*

A proper notion of weak solutions for nonlinear conservation laws requires such solutions to be *entropic*. Classical and more recent results show the important role that entropy plays in the analysis and computation of stable solutions. Entropy solutions are found to be at the crossroads when reached from a microscopic kinetic formulation or from a macroscopic realization as vanishing viscosity limit. In both cases, entropy solutions were also interpreted within a proper variational framework.

The notion of entropy, which is intimately connected with symmetry, is an extension imposed on nonlinear systems conservation laws. In this context, K. O. Friedrichs in his 1979 John von Neumann Lecture, asked

> "Now, in many branches of physics ... symmetries play a fundamental role, but all these symmetries—as it seems to me—are assumed and not derived. I now wonder whether or not ... symmetries can also be derived."

In this lecture I will give a concise overview on the theory and computation of entropy solutions for nonlinear conservation laws, and I will present a new variational formulation which addresses the question raised by Friedrichs. (Received September 16, 2013)