Cavitation, Concentration, and Transonic Shocks in Solutions of Nonlinear PDEs for Compressible Flow

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Abstract: In this talk, we will first discuss the formation and stability of cavitation (vacuum) in solutions of the isentropic Euler equations. Then we will describe and analyze a noval concentration phenomenon observed recently in solutions of the compressible Euler equations. This will be followed by the concentration and cavitation problem for spherically symmetric solutions of the compressible Euler and Navier-Stokes equations. Finally, we will discuss our recent results on the existence and stability of multidimensional transonic shocks in steady potential flows and free boundary problems.