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Scale-invariant Homentropic Compressible Flows and Their Application to the Noh Problem[1] JESSE GIRON, Arizona State University, SCOTT RAMSEY, ROY BATY, Los Alamos National Laboratory — The purpose of this work is to examine the group invariance properties of the inviscid Euler equations, subject to an equation of state (EOS) where the fluid pressure is regarded solely as an arbitrary function of the fluid density. We derive the conditions under which the resulting *homentropic* Euler equations and associated shock jump conditions are invariant under scaling groups. The invariance properties of these relations are used to construct a Noh-like solution featuring a constant velocity stagnation shock. For this solution to exist, we demonstrate that the EOS must satisfy a transcendental algebraic relation.

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Jesse Giron
Arizona State University

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