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Kinematical Compatibility Conditions for Vorticity Across Shock Waves ROY BATY, Los Alamos National Laboratory — This work develops the general kinematical compatibility conditions for vorticity across arbitrary shock waves in compressible, inviscid fluids. The vorticity compatibility conditions are derived from the curl of the momentum equation using singular distributions defined on two-dimensional shock wave surfaces embedded in three-dimensional flow fields. The singular distributions are represented as generalized differential operators concentrated on moving shock wave surfaces. The derivation of the compatibility conditions for vorticity requires the application of second-order generalized derivatives and elementary tensor algebra. The well-known vorticity jump conditions across a shock wave are then shown to follow from the general kinematical compatibility conditions for vorticity by expressing the flow field velocity in vectorial components normal and tangential to a shock surface.

Roy Baty
Los Alamos National Laboratory

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