2013   1   24   15   00   16   00
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The finite energy method for compressible fluids

This talk will concern the initial value problem for the Euler system of compressible fluid flows governed by a general pressure law, when solutions enjoy a certain symmetry and have solely finite total energy. In a recent series of papers with Pierre Germain (Courant Institute), we established an existence and compactness theory for this problem and analyzed the vanishing viscosity–capillarity limit in weak solutions with finite energy to the Navier-Stokes-Korteweg system. The proposed approach is referred to as the Finite Energy Method for compressible fluid flows and leads to a generalization of DiPerna's theorem (bounded solutions) and LeFloch-Westdickenberg's theorem (finite energy solutions) which covered polytropic fluids.