

Convergence of approximate solutions for isothermal gas dynamics with vacuum

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We study the hyperbolic system of Euler equations for an isothermal, compressible fluid. The *strong convergence theorem* of approximate solutions is proved by the theory of compensated compactness. The existence of weak entropy solution of Cauchy problems with large initial data and vacuum is also obtained. We note that we establish the commutation relations not only for the *weak* entropies but also for the *strong* ones by using the *analytic extension theorem*. The H^{-1} compact condition for strong entropies is not needed in our proofs.