An H-Theorem for Chemically Reacting Gases

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Abstract

The trend to equilibrium of a quaternary mixture undergoing a reversible reaction of bimolecular type is studied in a quite rigorous mathematical picture within the framework of Boltzmann equation extended to chemically reacting gases. A characterization of the reactive summational collision invariants, equilibrium Maxwellian distributions and entropy inequality allow to prove two main results under the assumption of uniformly boundedness and equicontinuity of the distribution functions. One of the results establishes the tendency of the reacting mixture to evolve to an equilibrium state as time becomes large. The other states that the solution of the Boltzmann equation for chemically reacting mixture of gases converges in strong L^1-sense to its equilibrium solution.

Keywords: Boltzmann equation; Reacting gases; Trend to equilibrium.
AMS codes: 76P05; 80A32; 82C40; 35B35

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