

ENTROPY DISSIPATION ESTIMATES FOR THE LINEAR BOLTZMANN OPERATOR

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Abstract

Abstract: We prove a linear inequality between the entropy and entropy dissipation functionals for the linear Boltzmann operator (with a Maxwellian equilibrium background). This provides a positive answer to the analogue of Cercignani's conjecture for this linear collision operator. Our result covers the physically relevant case of hard-spheres interactions as well as Maxwellian kernels, and we always work with a cut-off assumption. For Maxwellian kernels, the proof of the inequality is surprisingly simple and relies on a general estimate of the entropy of the gain part operator due to Matthes and Toscani (2012); Villani (1998). For more general kernels, the proof relies on a comparison principle. Finally, we also show that in the grazing collision limit our results allow to recover known logarithmic Sobolev inequalities. This is a joint work with M. Bisi (Parma) and J. A. Canizo (Granada).