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On the Boltzmann equation in the non-cutoff case

he Boltzmann equation models the evolution of a rarefied gas, in which particles interact through binary collisions, by describing the evolution of the probability density of particles. The equation balances transport operator with a collision operator, where the latter is a bilinear integral with an angular kernel that is non-integrable in many models. For a long time the equation was simplified by assuming that this kernel is integrable (so called Grad's cutoff), with a belief that such an assumption does not affect the equation significantly. However, it has recently been observed that a non-integrable singularity carries regularizing properties, which motivates further analysis of the equation in this setting. We study behavior in time of tails of solutions to the homogeneous Boltzmann equation in the non-cutoff regime, by examining the generation and propagation in time of L^1 and L^∞ exponentially weighted estimates and the relation between them. For this purpose we introduce Mittag-Leffler moments, which can be understood as a generalization of exponential moments. We show how the singularity rate of the angular kernel affects the order of the tails that can be propagated in time.

The talk is based on joint works with Alonso, Gamba, Taskovic and with Gamba, Taskovic.