

Fast Numerical Method for the Boltzmann Equation on Nonuniform Grids

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A new numerical method for the solution of the homogeneous Boltzmann equation on nonuniform grids is developed. The collision operator is written using the Fourier transform. This formulation and a special new discretization of the gain part allow for the fast numerical computations on nonuniform grids in velocity space. The computational cost of the algorithm is $O(N_v) + O(\sigma N^6 \log N)$ for a general model of interaction. Here N_v is the number of velocity points, N denotes the number of modes in the Fourier domain and $\sigma < 1$ is a small constant depending on the discretization. The results of some numerical test are presented.

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