

عنوان مقاله:

On the Expedient Solution of the Boltzmann Equation by Modified Time Relaxed Monte Carlo (MTRMC) Method

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خلاصه مقاله:

In the present study, a modified time relaxed Monte Carlo (MTRMC) method is developed for numerical solution of the Boltzmann equation in rarefied regimes. Taylor series expansion is employed to obtain a generalized form of the Wild sum expansion and consequently the modified collision functions with fewer inter-molecular interactions are obtained. The proposed algorithm is applied on the lid-driven micro cavity flow with different lid velocities and the results for velocity and shear stress distributions are compared with those from the standard DSMC and TRMC methods. The comparisons show excellent agreement between the results of the MTRMC method with their counterparts from TRMC and DSMC methods. The present study illustrates appreciable improvement in the computational expense of the MTRMC method compared to those from standard TRMC and DSMC methods. The improvement is more pronounced compared to the standard DSMC method. It is observed that up to ۵۶% reduction in CPU time is obtained in the studied cases.

کلمات کلیدی:

Boltzmann equation, Time relaxed Monte Carlo, modified time relaxed Monte Carlo, direct simulation Monte Carlo, Taylor series

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