ID de Contribution: **35**   Type: **Plenary talk**

Asymptotic preserving Arbitrary-Lagrangian-Eulerian methods for rigid body motion in a rarefied gas based on the BGK model

vendredi 19 novembre 2021 09:00 (45 minutes)

The talk is concerned with the simulation of moving rigid bodies immersed in a rarefied gas simulated by solving the Bhatnager-Gross-Krook (BGK) model for the Boltzmann equation. The computational domain for the rarefied gas changes with respect to time due to the motion of the boundaries of the rigid bodies. A one way, as well as a two-way coupling of rigid body motion and gas flow is considered.

An Arbitrary-Lagrangian-Eulerian method, where grid-points/particles are moved with the mean velocity of the gas is developed and investigated. For the spatial discretization we use a method based on a least-square approximation. For the time discretization an asymptotic preserving IMEX discretization is used. Results are compared with those of an extension of the Semi-Lagrangian numerical method suggested by Filbet & Russo to multiple space-dimensions. Moreover, the numerical results are compared with analytical, as well as with DSMC solutions of the Boltzmann equation.

Several test problems and applications illustrate the versatility of the approach.

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