The M_1 and M_2 angular moments models for rarefied gas dynamics. Numerical comparisons with the Navier-Stokes equations.

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Abstract. Angular moments models have been largely used for describing radiation transport [1] and charged particles transport [2]. In this communication and for the first time, the M_1 and M_2 angular moments models are presented for rarefied gas dynamics applications. After introducing the models studied and their appropriate discretisations, numerical simulations carried out in various collisional regimes are presented and demonstrate the interest of angular moments models for rarefied gas dynamics. For each numerical test cases, the differences observed between the angular moments models and the well-known Navier-Stokes equations are discussed and compared with reference kinetic solutions.

Key words. Angular moments models, rarefied gas dynamics, Navier-Stokes equations, kinetic equation, numerical comparisons.

References

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