

Generalized UGK Scheme in the Diffusive Limit

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The unified gas kinetic scheme (UGKS) was initially designed to address multiscale challenges in rarefied gas dynamics and then extended to radiative transfert theory, as described by BGK like relaxation models. In this talk, we extend its application to linear kinetic models with non isotropic scattering collision operators, as well as Fokker-Planck models . These problems typically exhibit a fully diffusive nature in the optically thick limit (corresponding to a small Knudsen number). It still leads to an asymptotic preserving (AP) property not only in this diffusive regime but also in the free transport limit. A series of numerical experiments confirm the effectiveness of the approach.