On the well-posedness of the Boltzmann's moment system of equations in fourth approximation

Aizhan ISSAGALI [1], Auzhan SAKABEKOV [2]

[1] *Nazarbayev University, Astana, Kazakhstan*
E-mail: aizhan.issagali@nu.edu.kz
[2] *Kazakh-British Technical University, Almaty, Kazakhstan*
E-mail: a.sakabekov@kbtu.kz

Abstract: We study the one-dimensional non-linear non-stationary Boltzmann's moment system of equations in fourth approximation with the tools developed by Sakabekov in [1–3]. For the third approximation system Sakabekov proves the mass conservation law (cf. Theorem 2.1 in [2]) and discusses the existence and uniqueness of the solution (cf. Theorem in [3]). We extend the analysis of the existence and uniqueness of the solution to the fourth approximation system. In particular, for the fourth approximation system we discuss the well-posed initial and boundary value problem and prove the existence and uniqueness of the solution belonging to the space of functions, continuous in time and square summable by spatial variable.

References

[1] Sakabekov, A. (2002). Initial and boundary value problems for the Boltzmann's moment system of equations. Almaty: Gylym.
[2] Sakabekov, A., Auzhani, Y. (2013). Analogue of the mass conservation law for third approximation of one-dimensional nonlinear Boltzmann's moment system equations. J. Math. Phys., 54(5), 053512. doi:10.1063/1.4805363
[3] Sakabekov, A., Auzhani, Y. (2014). Existence and uniqueness of solution of non-stationary Botzmann's moment system of equations in third approximation. TWMS J. Pure Appl. Math, 5, 36-42.