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Erratum on "On Some Properties of Kinetic and Hydrodynamic Equations for Ineleastic Interactions"

A. V. Bobylev, J. A. Carrillo, and I. M. Gamba

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This note corrects the strong form of the pseudo-Maxwellian collision integral given in ref. 1. The correction does not change main results of ref. 1 (Sections 3–8) based on the weak form of the integral. More precisely, it relates to the Boltzmann equation in strong form written after (2.8) and (2.10) in ref. 1. The identity (2.10) should read

$$Q(f, f) = \frac{1}{4\pi} \int_{\mathbb{R}^3} \int_{S^2} [f(t, v_*)\, f(t, w_*)\, J - f(t, v)\, f(t, w)]\, dn\, dw \tag{1}$$

where v_*, w_* are the pre-collisional velocities given by

$$v_* = \frac{1}{2}(v+w) - \frac{1-e}{4e}(v-w) + \frac{1+e}{4e}|v-w|\, n \tag{2}$$

$$w_* = \frac{1}{2}(v+w) - \frac{1-e}{4e}(v-w) - \frac{1+e}{4e}|v-w|\, n \tag{3}$$

and the Jacobian J is defined by:

$$J = \frac{1}{e^2} \frac{|v-w|}{|v_* - w_*|} \tag{4}$$

The nonhomogeneous version of it written after (2.8) in ref. 1 should have also the same factor J in front of the gain term and the pre-collisional velocities are defined as above.

As one can easily check, the corresponding weak form of the collision integral coincides with the weak form given in ref. 1:

$$\int dv g(v)\, Q(f, f) = \frac{1}{8\pi} \int_{\mathbb{R}^3} \int_{\mathbb{R}^3} \int_{S^2} f(t, v)\, f(t, w) \times [g(v') + g(w') - g(v) - g(w)]\, dv\, dn\, dw \tag{5}$$

where $g(v)$ is a test function and v', w' are post-collisional velocities given by

$$v' = \frac{1}{2}(v+w) + \frac{1-e}{4}(v-w) + \frac{1+e}{4}|v-w|\, n \tag{6}$$

$$w' = \frac{1}{2}(v+w) - \frac{1-e}{4}(v-w) - \frac{1+e}{4}|v-w|\, n \tag{7}$$

All results of Sections 3–8 in ref. 1 remain valid since they are based on the correct weak form of the collision integral.

REFERENCES

1. A. V. Bobylev, J. A. Carrillo, and I. M. Gamba, On some kinetic properties and hydrodynamics equations for inelastic interaction, *J. Stat. Phys.* **98**:743–773 (2000).