Nonlin. Processes Geophys. Discuss.,
https://doi.org/10.5194/npg-2017-54-RC1, 2017

Nonlinear Processes in Geophysics
Discussions
Open Access
EGU

Interactive comment on "Derivation of the entropic formula for the statistical mechanics of space plasmas" *by* George Livadiotis

Anonymous Referee #1

Received and published: 16 October 2017

This paper by George Livadiotis provides a derivation of the entropic formula for the statistical mechanics of space plasmas. The subject of the paper is very hot in view of the fact that the physical origin of the entropic formulation that leads to Kappa distributions, which describe velocities and energies of plasma populations in space plasmas, is still unknown. The present paper provides such a physical origin with a clear, original, concise and straightforward proof. I esteem that this proof by Livadiotis is very important and may become a cornerstone in this field. Since Nonlinear Processes in Geophysics (NPG) is an international and interdisciplinary journal for the publication of original research furthering knowledge on nonlinear processes in all branches of Earth, planetary, and solar system sciences, I also feel that the present paper obviously falls within the scope of NPG. For these reasons, I strongly recommend the publication of

Printer-friendly version

Discussion paper

this paper in NPG.

The treatment of the following minor points will strengthen the points made :

1)p.4, l.11 "(1960)"-> "(1957)"

2)p.4, l.22 "additivity)." -> "additivity."

3)p.9, l.6 "the 2nd constraint of" please clarify which constraint is considered second for the sake of the reader's convenience.

4)p.9, l.9 the existence of the inverse (g^{-1}) of the energy distribution function $g(\epsilon_i)$ is absolutely reasonable but it should it be mentioned for the sake of the reader's convenience.

5)p.10, l.9 "Again, the Lagrange constant, λ_1 and λ_2, are considered to be constant." please clarify.

6)p.10, Eq.(30) a symbol different from $h(x, y)$, e.g., $h_{A+B}(x, y)$, might be better to avoid reader's confusion with $h_i(\epsilon_i)$ of ll.6-7 of p.9.

7)p.10, l.15 "WA", "WB" -> "W$_A$", "W$_B$"

8)p.11, l.5 "functionals" -> "functional forms"

9)p.11, l.7 Please clarify that the selection of $f(x = 1) = 0$ is necessary from the condition $S[p_i = 1, p_j = 0 \ \forall \ j \neq i] = 0$.

Interactive comment on Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2017-54, 2017.

Printer-friendly version

Discussion paper