Review of: "Comparison of extended irreversible thermodynamics and nonequilibrium statistical operator method with thermodynamics based on a distribution containing the first-passage time"

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Potential competing interests: No potential competing interests to declare.

Review of the article “Comparison of extended irreversible thermodynamics and nonequilibrium

Statistical operator method with thermodynamics based on a distribution containing the first-passage time”

The article compares different approaches to problems of nonequilibrium thermodynamics: version of non-equilibrium thermodynamics, a distribution-based approach containing an additional thermodynamic first-passage time parameter; nonequilibrium statistical operator method; and extended irreversible thermodynamics with flows as an additional thermodynamic parameter. This is an interesting and relevant topic given the growing interest in first passage time and the many applications of this concept. In addition to comparisons of various directions of nonequilibrium thermodynamics, the article also contains important original results. Thus, in conclusion, the physical meaning of the parameter is revealed, which in the statistical distribution is associated with the random time of the first achievement. The author reveals new aspects of the nonequilibrium statistical operator method and extended irreversible thermodynamics. These aspects are not only of methodological interest. The theory of this paper is profound and has important academic value.

In this paper, the authors report the “Comparison of extended irreversible thermodynamics and nonequilibrium statistical operator method with thermodynamics based on a distribution containing the first-passage time”. The abstract and problem formulation past is well written. The content of the manuscript appears to be both original and intriguing. However, a few minor revisions are required to improve the manuscript quality. Once the revisions are made, I believe the manuscript would be well-suited for inclusion in «Continuum Mechanics and Thermodynamics».

Minor Revisions

1. Some grammatical and typographical mistakes are found in the manuscript. Carefully rectify all

such mistakes in the entire manuscript. So, in the last formula without a number before the conclusion, section 4, there is an obvious typo: instead of T, you need T 0 .

2. I recommend that the author emphasize the result in the 4. Conclusion about the physical meaning of the parameter, which in the statistical distribution is associated with the random time of the first achievement. Perhaps this issue should be given a separate section before the 4. Conclusion.

3. The article should also be more structured: subsections 2.1, 2.2, 3.1, 3.2 should be highlighted. Subsections 2.1 and 3.1 clearly indicate the similarities and differences between a version of non-equilibrium thermodynamics, a distribution-based approach containing an additional thermodynamic first-passage time parameter, the nonequilibrium statistical operator method, and extended irreversible thermodynamics with flows as an additional thermodynamic parameter.

4. Specify the use of the article results “Nonequilibrium Thermodynamics and Distributions Time to Achieve a Given Level of a Stochastic Process for Energy of a System”,

“Nonequilibrium Thermodynamics Based on the Distributions Containing Lifetime as a Thermodynamic Parameter”, [69], [70].

5. Write down somewhat more detail, for example, at the beginning of section 3.

6. Please add the following references.

- Thermal performance of Joule heating in radiative Eyring-Powell nanofluid with Arrhenius activation energy and gyrotactic motile microorganisms.
- On Consequences of Carreau Nanofluid Model with Dufour–Soret Effects and Activation Energy Subject to New Mass Flux Condition: A Numerical Study
- Thermal aspects of multiple slip and Joule heating in a Casson fluid with viscous dissipation and thermo-solutal convective conditions

After taking into account the comments, the article can be published in “Continuum Mechanics and Thermodynamics.”