Review of: "Quantum Solution of Classical Turbulence. Decaying Energy Spectrum"

Muslum Ozisik[1]

1 Yildiz Technical University

Potential competing interests: No potential competing interests to declare.

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Title : Quantum Solution of Classical Turbulence. Decaying Energy Spectrum

Comments to the author:

In summary, this article successfully presents a new model that has succeeded in transforming the decreasing turbulence problem in the Navier-Stokes equations, which has been introduced to the literature as a new theory and discussed in important scientific events, into a “Number Theory” problem in (3+1)-dimensions. By establishing a strong infrastructure both mathematically and physically, a complete duality has been achieved between the decaying classical turbulence in (3+1)-dimensions and the solvable one-dimensional quantum theory of Fermi particles on a ring. As a result, the theory, which has been presented in various scientific events and discussed in many events, but has turned into a scientific article with this study, has been detailed in every aspect, and an analytical solution proposal for quadrature decreasing turbulence has been successfully presented. Although it has brought a new perspective to the classical theories in this field, its non-contradiction with existing experimental data and its compatibility with current direct numerical simulations data are also solid foundations supporting the theory presented in the study. I think the article will be a focus not only for researchers interested in quantum mechanics in relation to turbulence, but also for classical mechanics and some mathematicians, and has a high citation capacity. The article is a professionally written scientific work with great effort in many aspects. I would like to make a small contribution to the article on a few issues listed below.

1-) There are too many keywords. Generally, I think four to six carefully chosen words will be sufficient.

2-) The main body of the paper consists of twelve subsections, and some of them consist of subsections within themselves. In such comprehensive and long scientific studies, one of the most basic elements that the reader generally focuses on is what the article contains as a whole. For this reason, it is recommended to give a general schematic structure regarding the sections of the article at the beginning. Just as a suggestion, I suggest giving a schematic structure like the one below at the end of " I. PROLOGUE " (or anywhere the author deems appropriate).

The skeleton of this scientific paper is structured as follows: Section I. Prologue, Section II. Definitions and notations, Section III. Summary, Section IV. Introduction, Section V. The Fermi ring and its continuum limit, Section VI. Instanton in the path integral, Section VII. The decaying energy in finite system, Section VIII. Comparing our theory with the DNS,

Section IX. The spectrum of scaling dimensions, Section X. Discussion, Section XI. Remaining problems and Section XII. Conclusion.

3-) There are many acronyms used in the article that are familiar to researchers working in this field. As emphasized before, the paper has the potential to attract the attention of not only researchers working in this field but also researchers from other disciplines. Additionally, considering that there may be young researchers who are just starting to work in this field, I recommend that acronym definitions be given where they are first used. (If desired, it is also possible to organize an abbreviation section at the end of the article.)

For example: (On page 3)

DNS : Direct Numerical Simulations

OPE : Operator Product Expansion

CFT : Conformal Field Theory (I am aware that it is defined on page 14)

etc.

4-) In the form of the given equations that include integrals, it would be more appropriate to write the differential in the integral on the far right. For example: The form given with Eq(41) is correct, but the form given with Eq(45) needs to be edited.

5-) It is recommended that given equations should be ended with an appropriate punctuation mark. For example:

Eqs(1-10) should be ended with full-stop.

(Please check the others)

6-) It is recommended that the complex unit number appeared as “ı” in some equations be arranged “i” as a conventional usage. For example: Eq(24) is correct but Eq(42) needs to be edited. (Please check the others)

7-) It is recommended to cite the appropriate reference(s) after some equations. For example Eq(1).

Dear respected editor and author;

In conclusion; as a researcher trying to add even a tiny drop to the ocean of science, I congratulate the author for his effort and work. The mentioned issues are just simple edits that can be made at the printing phase, which do not constitute an obstacle for the article to be published in the reputable Qeios, and I would be pleased to recommend that the present variation of the article be “accepted”.

Reviewer