The Warp Drive: search for a pure mathematical approach

Open Mathematics Collaboration*†

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Abstract

The purpose of this microarticle is to issue an open invitation in order to collaboratively devise the connection between the warp drive and its corresponding pure mathematical formulation (definitions, theorems, prerequisites). By this approach, I believe one can fully understand the mechanisms underlying this process, and we could finally move toward its application.

keywords: Alcubierre warp drive, general relativity, quantum gravity, faster than light

Introduction

1. Since its publication, there are more than 500 papers on the Alcubierre warp drive [1].

The goal

2. *Our main goal is to understand all the underlying mechanisms of the warp drive travel by means of pure mathematics.*

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Beginning with a list of prerequisites: a starting point

3. One needs to understand:

   (a) the pure mathematical formulation of general relativity;

   (b) the properties of the mathematical spaces described by general relativity and the quantum theories;

   (c) the topology associated with the warp drive;

   (d) etc.

Roadmap

4. In the following sections, we will list all important information to achieve (2).

A Pure Mathematical General Relativity

5. General Relativity is based on the Riemannian Geometry (RG).

6. RG is described by Differential geometry.

A Pure Mathematical Quantum Mechanics

7. Quantum Mechanics is based on the Hilbert Space (HS).

8. HS is a complex vector space with finite or infinite dimensions.

9. Linear algebra is the area that studies the HS.

Final Remarks

10. We expect to receive further help from the community to expand this discussion.

Open Invitation

Review, add content, and **co-author** this article [2,3]. *Join* the **Open Mathematics Collaboration**. Send your contribution to mplobo@uft.edu.br.

Ethical conduct of research

This original work was pre-registered under the OSF Preprints [4], please cite it accordingly [5]. This will ensure that researches are conducted with integrity and intellectual honesty at all times and by all means.

References

[1] Alcubierre, Miguel. "The warp drive: hyper-fast travel within general relativity." *Classical and Quantum Gravity* 11.5 (1994): L73. https://arxiv.org/pdf/gr-qc/0009013.pdf

[2] Lobo, Matheus P. "Microarticles." *OSF Preprints*, 28 Oct. 2019. https://doi.org/10.31219/osf.io/ejrct

[3] Lobo, Matheus P. "Simple Guidelines for Authors: Open Journal of Mathematics and Physics." *OSF Preprints*, 15 Nov. 2019. https://doi.org/10.31219/osf.io/fk836

[4] COS. *Open Science Framework.* https://osf.io

[5] Lobo, Matheus P. "The Warp Drive: Search for a Pure Mathematical Approach." *OSF Preprints*, 20 Apr. 2019. https://doi.org/10.31219/osf.io/ht246

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