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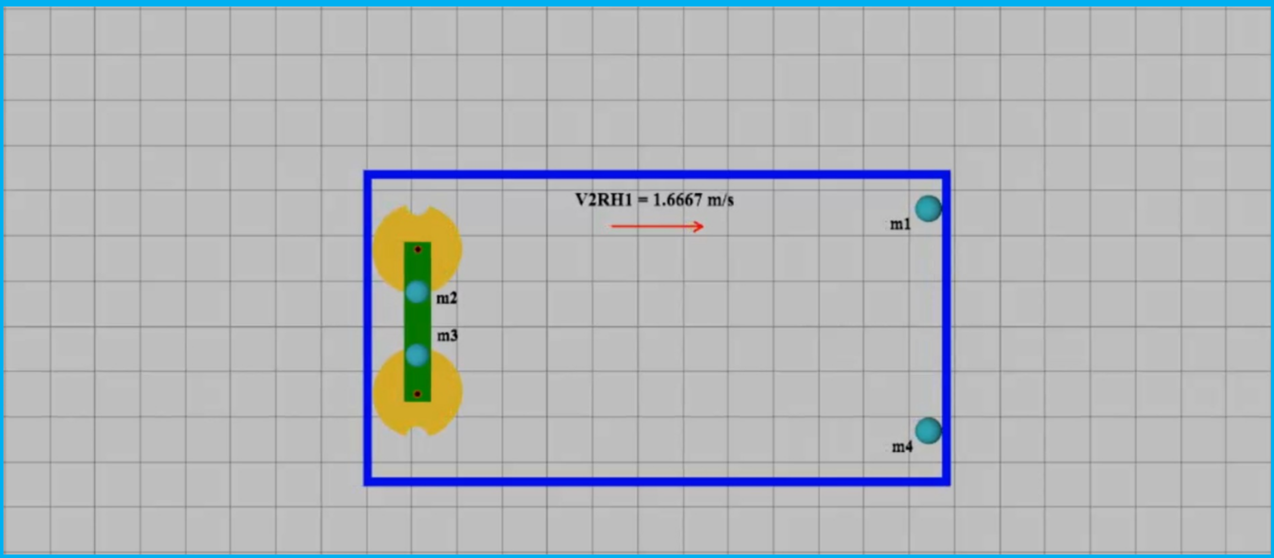
Obtaining and Proving an Uncompensated Momentum for a Closed Mechanical System Device Consisting of Two Hulls: A Theoretical Overview



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Obtaining and Proving an Uncompensated Momentum for a Closed Mechanical System Device Consisting of Two Hulls: A Theoretical Overview

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Abstract. This article examines a closed mechanical system consisting of two hulls. Using this system, we can obtain an uncompensated momentum for one of the hulls in the closed system by employing the design described below and performing the required processes in sequence. It should be noted that, according to the laws of classical mechanics, Newton in *"The Principia: Mathematical Principles of Natural Philosophy"* discusses the law of conservation of the center of mass's motion, but only for classical bodies. The device under consideration, however, consists of two hulls, each with different properties. In this case, to simplify this brief theoretical discussion, we have omitted some of the processes. This is because obtaining a single uncompensated momentum for one of the hulls in the closed system is sufficient to demonstrate the device's functionality.

Keywords: propulsion, closed mechanical system, uncompensated momentum

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Abbreviations:
UCM – Uncompensated Momentum
DTB – Device of Two Bodies
CM – Center of Mass
CS – Coordinate System

1. Introduction

Generating an Uncompensated Momentum (UCM) in a closed mechanical system can be achieved in various ways and using different devices. Below is a brief theoretical exposition of the possibility of generating a UCM using a Device of Two Bodies (DTB), with all processes taking place within a closed mechanical system. Note that, according to the laws of classical mechanics, Newton in [1] discusses the law of conservation of motion of the Center of Mass (CM), but only for classical bodies. Whereas the DTB consists of two hulls, one of which can be regarded as a classical (rigid) body. Consequently, the second hull has properties different from those of a classical body because it consists of a stand and two disks, with two spheres attached to each disk; these disks can rotate freely relative to the stand (as discussed in detail later in this article and in [2]).

As in this brief theoretical analysis, for the sake of simplicity we have omitted some of the processes, since obtaining a single UCM is sufficient to demonstrate the functionality of the DTB. *(In fact, similar to the discussion in [2] ("First Question, June 5, 2026" [3]), and for the case under consideration here, we can "position" the components of the entire mechanical system in their initial positions and repeat the cycle.)* In this way, we do not maintain complete continuity with [2], but that is not necessary. Since the goal here is to provide a brief theoretical exposition that can be analyzed and understood by readers with a basic knowledge of mechanics.

As shown in the third point of this theoretical discussion, we do not violate the law of conservation of energy (or the laws of classical mechanics), and certain aspects of efficiency have been partially examined. *(Note that the new terminology required (as well as the analysis of the processes), when examining the physical nature of the process, "conversion" of torque, via centripetal forces, into the translational velocity of the two released massive spheres, is voluminous; therefore, we do not address it in this case.)*

2. Obtaining and Proving an Uncompensated Momentum for a Closed Mechanical System Device Consisting of Two Hulls: A Theoretical Overview

In Fig. 1, we have a closed mechanical system consisting of two hulls, H1 and H2, which is in weightlessness in space and at rest relative to the Oxyz Coordinate System (CS). The geometric centers of hulls H1 and H2 coincide with the system's center of mass (CM), as shown. In this case, hull H1 (the blue frame) encloses hull H2 and defines the dimensions of the mechanical system.

and m4) to “drive” H1, this represents half the energy expended by the rechargeable battery. According to the formula for kinetic energy, the H1 hull receives half of the energy $E_{m1,\,m4}$ used by the battery,

$$E_{m1,m4} = \frac{1}{2}\, m_1 V^2 \,, \qquad (3)$$

where m_1 is the mass of the two spheres (m_1 + m_4), and V is the velocity of the spheres. Substituting the numerical values—20 kg for the two spheres and a velocity of 10 m/s—we obtain 1000 J of energy, with which we have “set in motion” the hull H1 (for the first resultant velocity V_{1RH1} (2) considered in this way). The rotating spheres m2 and m3, attached to D1 and D2, possess the same amount of energy, which we can return to the storage battery via the stopping EM shown in Fig. 3. (There are technical devices, such as reversible magnetic brakes and others, through which the energy can be returned to the battery for reuse.)

However, we must note that in this theoretical analysis, we are idealizing the processes, which would be difficult to achieve in a real device; consequently, the efficiency would be significantly lower.

(Furthermore, in this case we obtain only a single UCM; consequently, if we consider a complete cycle, as discussed in [2] and illustrated in [3], the efficiency decreases even further. Since “positioning” all components of the mechanical system in their initial positions also requires energy, this consequently reduces the second resultant velocity V_{2RH1}*.)*

However, despite the fact that the resulting UCM and the propellant-free propulsion in space that follows from it have certain weaknesses, they address fundamental problems in space technology and propulsion. Consequently, the potential of UCM represents a paradigm shift—a game-changer—for space missions and technologies.

References

[1] Isaac Newton, *The Principia: Mathematical Principles of Natural Philosophy*. University of California Press. Berkeley, Los Angeles, London (1999)

[2] Georgiev, L., Georgiev, D. (2026) *Propulsion in Space Without Propellant*, [E-book]. LDG2. ISBN: 978-619-94007-0-8, https://ldg2.com/en/product/propulsion-in-outer-space/

[3] Georgiev, L., Georgiev, D., *Questions and Answers, (First Question, June 5, 2026)* [PDF]. LDG2. https://ldg2.com/wp-content/uploads/2026/06/FAQ_EN.pdf

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Animation for the article

https://ldg2.com/en/theoretical-overview/

An animation titled 'Brief Theoretical Overview' has been developed and presented alongside the article. This animation illustrates the physical processes under consideration, which should be viewed strictly as supplementary material to the article, as certain effects have been intentionally exaggerated for ease of visualization.