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# Zeno's Paradoxes: A Timely Solution

Lynds, Peter (2003) *Zeno's Paradoxes: A Timely Solution*. [Preprint] (Unpublished)



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## Abstract

Zeno of Elea's motion and infinity paradoxes, excluding the Stadium, are stated (1), commented on (2), and their historical proposed solutions then discussed (3). Their correct solution, based on recent conclusions in physics associated with time and classical and quantum mechanics, and in particular, of there being a necessary trade off of all precisely determined physical values at a time (including relative position), for their continuity through time, is then explained (4). This article follows on from another, more physics orientated and widely encompassing paper entitled "Time and Classical and Quantum Mechanics: Indeterminacy vs. Discontinuity" (Lynds, 2003), with its intention being to detail the correct solution to Zeno's paradoxes more fully by presently focusing on them alone. If any difficulties are encountered in understanding any aspects of the physics underpinning the following contents, it is suggested that readers refer to the original paper for a more in depth coverage.

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This paper is closely related to a physics paper titled "Time and Classical and Quantum Mechanics: Indeterminacy vs. Discontinuity" which has recently been published in the August edition of "Foundations of Physics Letters" 16(4) (2003). REFERENCES: Albert, D. Time and Chance. Chp. 1. Harvard University Press, (2000). Arntzenius, F. Are there really instantaneous Velocities?. The Monist, vol 83, no 2, (2000). Brown, K. Zeno and the Paradox of Motion. www.mathpages.com/home/iphysics.html Davies, P. C. W. About Time: Einstein's Unfinished Revolution. Viking, London, (1995). Grunbaum, A. Modern Science and Zeno's Paradoxes. London, (1968). Guedj, D. Numbers: The Universal Language. Thames and Hudson/New Horizons, London, (1998). Honderich, T (ed). The Oxford Companion to Philosophy. Oxford University Press, (1995). Huggett, N (ed). Space from Zeno to Einstein: Classic Readings with a Contemporary Commentary. MIT Press, (1999). Jones, C, V. Zeno's paradoxes and the first foundations of mathematics (Spanish), Mathesis 3 (1), (1987). Lynds, P. Time and Classical and Quantum Mechanics: Indeterminacy vs. Discontinuity. Foundations of Physics Letters, 15(3), (2003). Makin, S. Zeno of Elea, Routledge Encyclopedia of Philosophy 9, 843-853. London, (1998). Malament, D. On the Time Reversal Invariance of Classical Electromagnetic Theory. Forthcoming in Stud. Hist. Phil. Mod. Phys. Morris, R. Achilles in the Quantum Universe. Redwood Books, Trowbridge, Wiltshire, (1997). O'Connor, J. J & Robertson, E. F. Zeno of Elea. www-gap.dcs.st-and.ac.uk/~history/Mathematicians/Zeno\_of\_Elea.html Russell, B. The Principles of Mathematics I. Cambridge University Press, (1903). Salmon, W. C. Zeno's Paradoxes. Bobbs-Merrill, New York, (1970). Sorabji, R. Time, Creation and the Continuum. Gerald Duckworth & Co. Ltd, London, (1983). Whitrow, G. J. The Natural Philosophy of Time. Nelson & Sons, London, (1961).

Keywords: Time, Zeno's Paradoxes, Zeno of Elea, Classical Mechanics, Quantum Mechanics, Indeterminacy, Discontinuity, Motion

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