

Time, Inertia and the Relativity Principle

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Abstract

In this paper I try to sort out a tangle of issues regarding time, inertia, proper time and the so-called “clock hypothesis” raised by Harvey Brown’s discussion of them in his recent book, *Physical Relativity*. I attempt to clarify the connection between time and inertia, as well as the deficiencies in Newton’s “derivation” of Corollary 5, by giving a group theoretic treatment original with J.-P. Provost. This shows how both the Galilei and Lorentz transformations may be derived from the relativity principle on the basis of certain elementary assumptions regarding time. I then reflect on the implications of this derivation for understanding proper time and the clock hypothesis.

Keywords: Time, relativity, inertia, Harvey Brown, Physical Relativity

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