

Abstract Submitted
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A Unified Proposal for Intervals between Events in Space-time

DOUGLAS SWEETSER, Quaternions.com of Acton, MA — A Universe with one observer is easy: the chosen one could measure two events, record the difference between time and distance, and retire having no one with whom to quarrel. Introduce a second observer and two deeply different but successful theories are needed. If one observer is traveling at a constant velocity relative to the other, then special relativity characterizes how one observer analyzes the other based on the Poincaré group. Yet if the two observers are at fixed distances from a gravitational source - thus being non-inertial - general relativity is used to understand how the other's observations look. GR has a Lagrange density that when varied with respect to a metric tensor, creates ten non-linear, second order differential equations. Yet both SR and GR say that Nature leaves one's own local measurements alone. Both detail how one observer can look from afar at the other observer and detail how those changes look different to him. The foundations of SR and GR could not be more different. The quaternion gravity proposal adds the multiplication operator to the manifold of events in space-time. I argue that different symmetries of a quaternion squared is sufficient to explain what one observer can say about the other observer's measurements.

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