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Geodesics and Acceleration in Influence Theory JAMES WALSH, KEVIN KNUTH, University at Albany (SUNY) — Influence theory is concerned with a foundational approach where it is assumed that particles influence one another in a discrete one-to-one fashion. This results in a partially ordered set of influence events, called the influence network, where particles are represented by totally ordered chains of events. Information physics considers physical laws to result from consistent quantification of physical phenomena. Knuth and Bahreyni (2014) demonstrated that the mathematics of spacetime emerges from consistent quantification of influence events by embedded coordinated observers. Knuth (2014) showed that in 1+1 dimensions observer-based predictions about a free (uninfluenced) particle result in the Dirac equation. Here, we show that when a particle in 1+1 dimensions is influenced, it is uniquely and consistently described in terms of relativistic acceleration for constant rate of influence and in general obeys equations of the form of the geodesic equations of general relativity. This suggests that Influence Theory can also account for forces (like gravity), which give rise to well-known relativistic effects such as time dilation.

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