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Relativity Principles and the Hyperbolic Brachistochrone Equation

Monday 1 December 2025 16:00 (1 hour)

Time optimal control theory is a new and emergent branch of physics that seeks to modify the dynamic operators encoding the time evolution of the system in order to achieve optimised transitions between input and output states. Recent progress in the analysis of the hyperbolic brachistochrone equation using this method has uncovered a link to the Fubini-Study metric, an important object in the study of differential geometry. This talk will focus on the development of some new techniques for finding metrics and pseudounitary operators in various hyperbolic geometries, and relate their properties to associated problems in heat flow and diffusion in curved spaces using an eigenvalue decomposition method. We discuss the properties of hyperbolic metrics, and show how these can be used to derive a theory of metric flow on surfaces that is analogous to general relativity.

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