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Statistical Manifold Construction of General Relativity GEORGE DAVILA, Univ of Central Florida — We discuss how a Riemannian geometry can be associated with a probability distribution. We deal with spacelike 3-surfaces, Σ_t, of a foliated spacetime, as is done in the ADM formalism. A metric geometry can then be constructed from the associated probability distribution and written as a function of the relative entropy between parameters of the distribution. We can then choose the statistical distribution to be an entanglement distribution and the entropy to be the entanglement entropy. It is then straightforward to obtain a geometry on which the conceptual basis of the Maldacena-Susskind conjecture (ER=EPR) holds, i.e. fully correlated regions are connected by zero metric distance. Additionally, entirely uncorrelated regions are maximally separated in terms of metric distance. In this construction Euclidean 3-space can be said to be a thermal bath of entangled regions of space. Aside from providing conceptual insights, this construction allows us to derive metric geometries from probability distributions using the the techniques of information geometry.

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