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Oberseminar Dynamische Systeme

Characterization of the null energy via displacement convexity of entropy

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Abstract:

I will present a characterization of the null energy condition for an $(n+1)$ -dimensional, time-oriented Lorentzian manifold in terms of convexity of the relative $(n-1)$ -Renyi entropy along null displacement interpolations on null hypersurfaces. More generally, I consider a Lorentzian manifold with a weight function and I introduce a synthetic Bakry-Emery N -null energy condition that we characterize in terms of null displacement convexity of the relative N -Renyi entropy. Here the relative N -Renyi entropy is given w.r.t. the co-dimension 2 reference measure induced by the Lorentz metric and the weight. As applications we prove Hawking's area monotonicity theorem for the area of a black hole horizon and a Penrose singularity theorem in the context of weighted Lorentzian manifolds.

Guests are very welcome!