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Generalized cones as Lorentzian length spaces

Smooth Lorentzian warped products of the form $I \times_f (M, g)$, where (M, g) is a Riemannian manifold and f is a positive smooth function on an interval I , are important examples of spacetimes: They contain well-known physical models (such as the FLRW spacetimes) and admit a very simple description of causal curves and geodesics. In this talk we will examine what happens if one replaces the Riemannian manifold with a length space: We shall see that for these *generalized cones* one still has a natural notion of causal curves and their length and hence also of the causality relations, turning them into Lorentzian length spaces. Moreover, synthetic timelike curvature bounds of such generalized cones are directly related to Alexandrov curvature bounds of the length space and convexity/concavity properties of f . Finally, we will formulate (and sketch the proof of) singularity theorems for these spaces. This is joint work with S. B. Alexander, M. Kunzinger and C. Sämann.