A remark on convex functions and isometry groups of Lorentzian manifolds

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Abstract. Let M be a Lorentzian manifold, G be a connected and compact subgroup of the isometries of M, and f be a differentiable function on M. We show that if f is strictly convex without minimum along causal geodesics, then all G-orbits are fixed points of G or they are spacelike submanifolds of M. Also, if f is G-bounded and strictly convex along causal geodesics and it has a minimum point, then G has a fixed point or it has a spacelike orbit.

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