
Unique Continuation in Asymptotically Anti-de Sitter Spacetimes

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Abstract

In this talk, we consider the problem of unique continuation from infinity for Anti-de Sitter (AdS) and asymptotically AdS spacetimes. We show, roughly, that given a solution ϕ of a linear (massive or massless) wave equation on AdS spacetime, if ϕ and its first derivative vanish to high enough order (depending on the mass) on a sufficiently large but finite portion of infinity, then ϕ must also necessarily vanish in a small neighborhood of infinity. In particular, this establishes a correspondence between data for ϕ at infinity and the value of ϕ in the interior. When available, we also connect our results to the well-posedness theory: we show that trivial Dirichet and Neumann data at (a large enough portion of) infinity along with sufficient regularity implies vanishing in the interior. Furthermore, all these results generalize to a large class of asymptotically AdS spacetimes, as well as to tensor-valued waves. These techniques are also viable for studying nonlinear wave equations; one application is to study corresponding uniqueness properties for the Einstein-vacuum equations with negative cosmological constant.

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