The validity of Huygens' principle for the scalar wave equation on curved space-time

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Abstract

Huygens' principle is said to valid for the wave equation on curved space-time if the solution to Cauchy's problem at any point depends only on the initial data in an arbitrarily small neighborhood of the intersection of the past null conoid from the point with the initial surface. Hadamard posed the problem of determining all equations that satisfy Huygens' principle and conjectured that such equations are equivalent to the pure wave equation on Minkowski space. Guenther showed that the wave equation on the plane wave space-time is a counter-example to the conjecture. The lecture will include a brief history of the attempts to solve Hadamard's problem followed by a description of the latest results and the methods used to obtain them.