
Von Mises, Church, and the Birth of Algorithmic Randomness

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Abstract

The goal of this talk is to highlight the circumstances under which computability theory was first applied to the study of randomness. This application, made by Alonzo Church in 1940, was an attempt to address what was widely held to be a defect in the von Mises' definition of random sequences. Although Church's application is recognized as yielding the first definition of algorithmic randomness, little attention has been given to the question as to whether von Mises would have accepted Church's modification of his original definition. There is reason to hold that von Mises would have rejected this solution, despite the fact that von Mises never references Church's definition in print. However, insight into this question is provided by the brief correspondence in the early 1960s between Church and Hilda Geiringer, von Mises' wife, herself a mathematician who edited a number of von Mises' works after his death in 1953. I will discuss some of the details of this correspondence, what it reveals us about the relationship between von Mises' definition and Church's definition of randomness, and what it reveals about Church's view as to the unique role that computability plays in the solution of problems of the probability calculus.

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