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Finitary and Infinitary Mathematics, the Possibility of Possibilities and the Definition of Probabilities.

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Abstract

Some relations between physics and finitary and infinitary mathematics are explored in the context of a many-minds interpretation of quantum theory. The analogy between mathematical ``existence'' and physical ``existence'' is considered from the point of view of philosophical idealism. Some of the ways in which infinitary mathematics arises in modern mathematical physics are discussed. Empirical science has led to the mathematics of quantum theory. This in turn can be taken to suggest a picture of reality involving possible minds and the physical laws which determine their probabilities. In this picture, finitary and infinitary mathematics play separate roles. It is argued that mind, language, and finitary mathematics have similar prerequisites, in that each depends on the possibility of possibilities. The infinite, on the other hand, can be described but never experienced, and yet it seems that sets of possibilities and the physical laws which define their probabilities can be described most simply in terms of infinitary mathematics.

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