On the number of infinite sequences with trivial initial segment complexity

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Abstract

The infinite sequences which have trivial prefix-free initial segment Kolmogorov complexity are known as K-trivial, and form a cumulative hierarchy of length ω.

In this talk I will discuss the recent solution to a question which asked for the arithmetical complexity of the problem of finding the number of K-trivial sequences in the various levels of the hierarchy. The answer is that it lies sharply on the 3rd level of arithmetical complexity, and it is obtained via an interesting combination of many results in the area of K-trivial sequences. This will give me the opportunity to give an exposition of this important topic in algorithmic randomness, along with explaining the solution to the problem.

I will also show an analogous result for the hierarchy of the low for K sequences, which are the ones that (when used as oracles) do not give shorter initial segment complexity compared to the computable oracles. This will demonstrate the generality of the methodology that I use.