Mathematics > Logic

Limit complexities revisited [once more]

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The main goal of this article is to put some known results in a common perspective and to simplify their proofs.

We start with a simple proof of a result of Vereshchagin saying that $\limsup_n C(x|n)$ equals $C^{0'}(x)$. Then we use the same argument to prove similar results for prefix complexity, a priori probability on binary tree, to prove Conidis' theorem about limits of effectively open sets, and also to improve the results of Muchnik about limit frequencies. As a by-product, we get a criterion of 2-randomness proved by Miller: a sequence X is 2-random if and only if there exists c such that any prefix x of X is a prefix of some string y such that $C(y)\ge |y|-c$. (In the 1960ies this property was suggested in Kolmogorov as one of possible randomness definitions.) We also get another 2-randomness criterion by Miller and Nies: X is 2-random if and only if $C(x)\ge |x|-c$ for some c and infinitely many prefixes x of X.

This is a modified version of our old paper that contained a weaker (and cumbersome) version of Conidis' result, and the proof used low basis theorem (in quite a strange way). The full version was formulated there as a conjecture. This conjecture was later proved by Conidis. Bruno Bauwens (personal communication) noted that the proof can be obtained also by a simple modification of our original argument, and we reproduce Bauwens' argument with his permission.

Comments:	See this http URL for the old paper
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