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The dimension of ergodic random sequences

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Let \mu be a computable ergodic shift-invariant measure over the Cantor space. Providing a constructive proof of Shannon-McMillan-Breiman theorem, V'yugin proved that if a sequence x is Martin-L\"of random w.r.t. \mu then the strong effective dimension Dim(x) of x equals the entropy of \mu. Whether its effective dimension dim(x) also equals the entropy was left as an problem question. In this paper we settle this problem, providing a positive answer. A key step in the proof consists in extending recent results on Birkhoff's ergodic theorem for Martin-L\"of random sequences.

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