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Stationary distributions of iterated function systems

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Iterated function systems (IFSs) with probabilities have been investigated in various settings. In the simplest case, they can be interpreted as Markov chains. In this context, it was proved that for every continuous probability distribution μ with support in $\mathbb{R}$, there exists an IFS for which μ is the unique stationary distribution of the associated Markov chain. Moreover, only two functions are sufficient for the construction of such an IFS. In this work, we study a discrete analogue of this problem. Specifically, we show that for almost all discrete probability distributions μ supported on the set $\{1, ..., n\}$, μ is not the unique stationary distribution of the Markov chain corresponding to IFSs generated by $n-1$ (or fewer) functions, while it is trivial to construct IFS generated by n function with μ as its unique stationary distribution for any μ.

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Author: KOVAC, Jozef (KAMŠ)

Co-authors: VESELY, Jan; JANKOVA, Katarina

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