Hoppen, Carlos; **Kohayakawa, Yoshiharu**; **Moreira, Carlos Gustavo**; **Ráth, Balázs**; **Sampaio, Rudini Menezes**

Limits of permutation sequences. (English) Zbl 1255.05174

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Summary: A permutation sequence $(\sigma_n)_{n\in\mathbb{N}}$ is said to be convergent if, for every fixed permutation τ, the density of occurrences of τ in the elements of the sequence converges. We prove that such a convergent sequence has a natural limit object, namely a Lebesgue measurable function $Z:[0,1]^2\to[0,1]$ with the additional properties that, for every fixed $x\in[0,1]$, the restriction $Z(x,\cdot)$ is a cumulative distribution function and, for every $y\in[0,1]$, the restriction $Z(\cdot,y)$ satisfies a "mass" condition. This limit process is well-behaved: every function in the class of limit objects is a limit of some permutation sequence, and two of these functions are limits of the same sequence if and only if they are equal almost everywhere. An ingredient in the proofs is a new model of random permutations, which generalizes previous models and might be interesting for its own sake.

MSC:

05C80	Random graphs (graph-theoretic aspects)
05A05	Permutations, words, matrices
05C50	Graphs and linear algebra (matrices, eigenvalues, etc.)

Keywords:

permutations; limits of sequences of discrete objects; probability theory

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