On numbers of permutations being products of pairwise disjoint cycles of length d

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In [AM] T. Amdeberhan and V. Moll studied combinatorical identities, 2-adic valuations and asymptotics of numbers $H_2(n)$ of involutions of a set with n elements, i. e. permutations $\sigma \in S_n$ such that σ^2 is the identity function.

Let us notice that each involution can be written as a product of pairwise disjoint transpositions. Then there is natural to ask about arithmetic properties of numbers $H_d(n)$ of permutations of a set with n-elements which are products of pairwise disjoint cycles of length d (d is a fixed positive integer greater than 1). During the talk I will present some results on numbers $H_d(n)$, e. g. periodicity of sequences $(H_d(n) \pmod{p^r})_{n \in \mathbb{N}}$ where p is a prime number and r is a positive integer, p-adic valuations and properties of polynomials associated with exponential generating functions of sequences $(H_d(n))_{n \in \mathbb{N}}$.

This is a joint work with Maciej Ulas.

[AM] T. Amdeberhan and V. H. Moll, *Involutions and their progenies*, J. Comb., 6 (4) (2015), 483-508.