
LUCAS REIS, University of Sao Paulo

Permutations of finite sets from an arithmetic setting

Let $n, m > 1$ be integers with $\gcd(n, m^2) = m$. We introduce the concept of (n, m) -*piecewise affine permutations*. These are permutations of the finite set

$$[1, n] := \{1, \dots, n\},$$

defined by m affine-like rules with some generic arithmetic properties. We discuss the existence and number of these permutations. Our main result provides an explicit description on the *cycle decomposition* of such permutations. As a main application, we obtain (new?) classes of permutation polynomials of finite fields whose cycle decomposition can be explicitly given. We further discuss algebraic properties of these permutation polynomials, including their *weight* and *index*.