

## SEMINÁRIOS DE ÁLGEBRA – 1S 2023

### Subgroup and Subalgebra Growth

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Abstract: We compute the multiple zeta function for the free abelian group  $Z^d$  that corresponds to decompositions of finite factor groups into the sum of cyclic factors. As application, we describe the decomposition of a random finite factor group into cyclic factors. We conclude that such a factor group "mainly" consists of only one cyclic factor. Also, the probability that a finite factor group is cyclic is at most 0.8469 for all ranks  $d$ .

We discuss the growth of subalgebras for restricted Lie algebras. This type of growth is a natural analogue of the subgroup growth in group theory. First, we describe the growth of subalgebras for free restricted Lie algebras of finite rank over finite field. Next, we discuss the subalgebra growth for abelian and metabelian restricted Lie algebras.

Also we discuss the one-sided ideal growth for the free associative algebras over finite fields.