ID de Contribution: **14** Type: **Non spécifié**

Computational Complexity in Column Sums of Symmetric Group Character Tables and Counting of Surfaces

jeudi 21 novembre 2024 14:50 (50 minutes)

The character table of the symmetric group S_n, of permutations of n objects, is of fundamental interest in theoretical physics, combinatorics as well as computational complexity theory. We investigate the implications of an identity, which has a geometrical interpretation in combinatorial topological field theories, relating the column sum of normalised central characters of S_n, to a sum of structure constants of multiplication in the centre of the group algebra of S_n. The identity leads to the proof that a combinatorial computation of the column sum belongs to complexity class #P. The sum of structure constants has an interpretation in terms of the counting of branched covers of the sphere. This allows the identification of a tractable subset of the structure constants related to genus zero covers. We use this subset to prove that the column sum for a conjugacy class labelled by partition λ is non-vanishing if and only if the permutations in the conjugacy class are even. This leads to the result that the determination of the vanishing or otherwise of the column sum is in complexity class P.

Orateur: BENGELOUN, Joseph (LIPN, Paris XIII)