Characters of p-solvable and π-separable groups

Nicola Grittini

If G is a π-separable group, where π is a set of primes, it is possible to define a peculiar set of characters $\mathrm{B}_\pi(G)$, subset of the set of the irreducible characters. It was first defined by Isaacs in 1982, with the aim of finding a generalization of the Brauer characters for more then one prime. These characters have been later studied by several authors and for other purposes, however, some aspects of the theory remained not investigated.

The talk will begin with a brief introduction to the theory of the B_π-characters, to see how this set of characters is constructed, how it can be used to generalize Brauer characters and which basic properties the B_π-characters share. Then, we will see a B_π-characters version of some of the most famous problems in Character Theory of Finite Groups, like the search of results of Ito-Michler type, variants of Thompson Theorem on character degrees and the construction of a natural McKay correspondence.

It will be underlined how the set of characters $\mathrm{B}_\pi(G)$ shares some properties with the set of irreducible Brauer characters, while the set $\mathrm{B}_\pi(G) \cup \mathrm{B}_{\pi'}(G)$ shares some with the set of irreducible ordinary characters.

Finally, in a p-solvable group, we will use the B_p-characters as a tool to study an apparently unrelated problem: how the group structure is influenced by the degrees of characters which have values in a field only slightly larger then $\mathbb{Q}$.