

# INVESTIGATIONS OF DEPTH OF SUBGROUPS IN FINITE GROUPS

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The concept of depth originates from Von-Neumann algebras, it was also investigated for Hopf algebras. The notion of depth of subgroups was introduced in the paper [1] by Burciu, Kadison and Külshammer. It is the so called depth of the algebra inclusion of the complex group algebras  $CH \subseteq CG$ . The subgroups of depth 1 and 2 are well described, e.g. a subgroup is normal if and only if it is of depth at most 2. It is an open problem if subgroups of arbitrary big even depth exist or not. In this talk we will introduce the concept of depth of a subgroup of a finite group with the help of the Frobenius matrix. We will present some GAP functions written for the investigations of subgroups of even depth. We will show examples of groups even depth bigger than 2 that can be found in the various GAP libraries. Another open problem is to characterize subgroups of depth 3. If a subgroup is a trivial intersection subgroup, i.e. it has trivial intersection with its conjugates, then it is of depth three. We will show examples of depth 3 subgroups that are not disjoint from their conjugates.

- [1] S. BURCIU, L. KADISON, B. KÜLSHAMMER, On subgroup depth, *Int. Electr. J. Algebra* **86/9** (2009).