FINITE GROUPS WITH A SPLITTING AUTOMORPHISM OF ORDER A POWER OF 2

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Let G be a group and α be an automorphism of G of order n. If for every $x \in G$ one has

$$x.x^{\alpha}.x^{\alpha^2}\ldots x^{\alpha^{n-1}} = 1$$

then α is called a splitting automorphism of order n. Fixed point free automorphisms of finite groups are natural examples of splitting automorphisms. Kegel generalized Thompson's result of nilpotentcy of a finite group with a fixed point free automorphism of prime order to the finite groups admitting a splitting automorphism of prime order. Moreover, Higman, Kreknin and Kostrikin proved that if a finite group G has a splitting automorphism of prime order p, then the nilpotency class of G is bounded in terms of p.

A finite group having a fixed point free automorphism is solvable. On the contrary, a finite group admitting a splitting automorphism may not be solvable. But Jabara proved that a finite group with a splitting automorphism of order 4 is solvable. Moreover, we proved the following:

Theorem. *[1] A finite group with a splitting automorphism of odd order is solvable.*

In this talk, we will present recent results proved in a joint work with Kanta Gupta and Enrico Jabara [2], describing the structure of a finite group with a splitting automorphism of order 2^n.

References

[1] K. Ersoy, "Finite groups with a splitting automorphism of odd order", Arch. Math, Volume 106, Issue 5, pp 401407 doi: 10.1007/s00013-016-0874-6, May 2016

[2] K. Ersoy, C.K. Gupta, E. Jabara, "Finite groups with a splitting automorphism of even prime power order", in preparation.