THE SPECTRA OF ALMOST SIMPLE EXCEPTIONAL GROUPS OF LIE TYPE

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The spectrum $\omega(G)$ of a finite group G is the set of the orders of elements of G. About 15 years ago V.D. Mazurov posed the following conjecture: if L is a finite nonabelian simple group of Lie type of sufficiently large Lie rank and G is a finite group such that $\omega(G) = \omega(L)$, then, up to isomorphism, we have $L \leq G \leq \operatorname{Aut} L$, that is, G is an almost simple group with socle L. The proof of this conjecture was completed in 2015, and that naturally suggested the question of how to find the spectra of finite almost simple groups of Lie type.

The finite simple groups of Lie type are divided into two classes: the classical groups and the exceptional groups. The classical groups can be obtained from suitable matrix groups, and the geometry of the underlying vector space can be used to work with automorphisms and calculate their orders. In the talk, we discuss how to calculate the orders of elements in almost simple exceptional groups and, in particular, what one can use instead of the above geometry (based on joint work with A. A. Buturlakin).

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