3. Shemetkov, L.A. Formations of finite groups / L.A. Shemetkov. – Moscow: Nauka, 1978. – 272 p.
4. Shemetkov, L.A. Formation of algebraic systems / L.A. Shemetkov, A.N. Skiba. – Moscow: Nauka, 1989. – 256 p.

ABOUT THE PRODUCT FISHER SET AND FISHER CLASS

H. Vaitkevich
VSU named after P.M. Masherov, Vitebsk, Belarus

Throughout this paper, all groups are finite. In the definitions and notation, we follow [1].

Remind that class $\mathfrak{F}$ is a *Fitting class* [1] if and only if the following two conditions are satisfied:

(i) If $G \in \mathfrak{F}$ and $N \trianglelefteq G$, then $N \in \mathfrak{F}$;

(ii) If $M, N \trianglelefteq G = MN$ with M and N in $\mathfrak{F}$, then $G \in \mathfrak{F}$.

A subgroup U of a group G is said to be *subnormal in* G if there exists a chain of subgroups $U_0, U_1, \dots, U_r$ of G such that

$U = U_0 \trianglelefteq U_1 \trianglelefteq \cdots \trianglelefteq U_{r-1} \trianglelefteq U_r = G$.

This is called a *subnormal chain from* U *to* G. If U is subnormal in G, we shall write $U \trianglelefteq\trianglelefteq G$.

Theorem [1]. Let $\{U_i : i \in I\}$ be a *set of subnormal subgroups of a finite group G*. Then their join $\mathcal{J} =< U_i : i \in I >$ is also subnormal in G.

For a class $\mathfrak{F}$ of groups we define:

$N_0\, \mathfrak{F} = (G : \exists K_i \trianglelefteq\trianglelefteq G\ (i = 1, \dots, r)\ with\ K_i \in \mathfrak{F}\ and\ G =< K_1, \dots, K_r >)$.

A class $\mathfrak{F}$ of arbitrary finite groups is called a *Fischer class* [1] if

(i) $\mathfrak{F} = N_0\, \mathfrak{F} \neq \emptyset$, and

(ii) If $K \trianglelefteq G \in \mathfrak{F}$ and H/K is a nilpotent subgroup of G/K, then $H \in \mathfrak{F}$.

A non-empty set $\mathcal{F}$ of subgroups of a group G is called a *Fitting set of* G [1] if the following three conditions are satisfied:

FS1: If $T \trianglelefteq\trianglelefteq S \in \mathcal{F}$, then $T \in \mathcal{F}$;

FS2: If $S, T \in \mathcal{F}$ and $S, T \trianglelefteq ST$, then $ST \in \mathcal{F}$;

FS3: If $S \in \mathcal{F}$ and $x \in G$, then $S^x \in \mathcal{F}$.

Lemma [1]. *Let* $\mathfrak{F}$ *be an* N_0*-closed class and* G *a finite group. Then the set* $\mathcal{G} = \{N \trianglelefteq\trianglelefteq G : N \in \mathfrak{F}\}$, *partially ordered by inclusion, has a unique maximal element, denoted by* $G_{\mathfrak{F}}$ *and called the* $\mathfrak{F}$*-radical of G. It is a characteristic subgroup of* G, *and if* $\mathfrak{F}$ *is a Fitting class and* $K \trianglelefteq\trianglelefteq G$, *then* $K_{\mathfrak{F}} = K \cap G_{\mathfrak{F}}$.

A *Fischer set of* G [1] is a Fitting set $\mathcal{F}$ of G which has the following property:

FS4: If $K \trianglelefteq L \in \mathcal{F}$ and if H/K is a nilpotent subgroup of L/K, then $H \in \mathcal{F}$.

In the theory of classes of groups the know result of Lockett [2] that the product two of Fischer classes is Fischer class.

In [3] it is defined the product Fitting set and Fitting class.

Definition [3]. For a Fitting set $\mathcal{F}$ of G and a Fitting class $\mathfrak{F}$, we call the set $\{H \leq G | H/H_{\mathcal{F}} \in \mathfrak{F}\}$ of subgroups of G *the product of* $\mathcal{F}$ *and* $\mathfrak{F}$, and denote it by $\mathcal{F} \circ \mathfrak{F}$.

As stated in [3] $\mathcal{F} \circ \mathfrak{F}$ is a Fitting class.

The main purpose of this paper study of the product of Fischer set and Fischer class. It is proved.

Theorem. Let $\mathcal{F}$ is a Fischer set of G and $\mathfrak{F}$ is a Fischer class, then $\mathcal{F} \circ \mathfrak{F}$ is a Fischer set of G.

Reference list:

1. Doerk K. Finite soluble groups / K. Doerk, T. Hawkes. – Berlin – New York : Walter de Gruyter, 1992. – 891p.
2. Lockett F.P. On the theory of Fitting classes of finite solvable groups: Ph. D. thesis University of Warwick / F.P. Lockett. – Warwick, 1971.
3. Vorob'ev N.T. On F-injectors of Fitting set of a finite group / Vorob'ev N.T., Nanying Yang, W.Guo. – Com. in Algebra, 2018, Vol. 46, № 1. – P. 217–229.

ON SOLVABILITY OF SOME CLASSES OF ALGEBRAIC EQUATIONS IN RADICALS

V. Zhgirov
VSU named after P.M. Masherov, Vitebsk, Belarus

The relevance of this work is to obtain the most convenient method for solving algebraic equations, and to answer the question whether this equation is solvable in radicals.

The purpose of the article is formulate and justify the necessary and sufficient conditions for the representability of algebraic polynomials of the fourth and eighth degree in the form of a superposition of quadratic polynomials, as a consequence of the solvability conditions in the eighth degree equation by radicals.

Material and methods. Material of this article the algebraic equations. In the study, methods of algebra, mathematical analysis and the computer mathematics system Maple 2017 were used in the research.

Findings and their discussion. Suppose the algebraic equations of the form:

$$f(z) = 0,$$

where $f(z)$ - fourth degree polynomial, which is a superposition of a quadratic polynomial. That is, has the following form: