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n-Commutator Groups

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**Abstract:** A sufficient condition such that any element of  $G'$  (the commutator subgroup of  $G$ ) can be represented as a product of  $n$  commutators, was studied in [GAL62]. In this article we study a necessary and sufficient condition such that any element of  $G'$  can be represented as a product of  $n$  commutators, Let  $n$  be the smallest nature number such that any element of finite group  $G$  can be represented as a product of  $n$  commutators. A group  $G$  with this property will be called an  $n$ -commutator group, and  $n$  will be denoted by  $c(G)$ . Then  $\frac{\ln(|G'|)}{\ln(|G:Z(G)|)} \leq 2c(G)$ . In particular, if the all elements of  $G'$  can be represented as a commutator, then  $|G'| \leq |G:Z(G)|^2$ .

**Key Words:** Commutator subgroup, irreducible characters.

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