



Improving the results of I. M. Isaacs on derived subgroups and centers of capable groups*

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Abstract

Some results on derived subgroups and centers of capable groups are given by I. M. Isaacs. The goal of this talk is to improve these results under the weaker hypotheses. Moreover, we show that there exists an upper bound for the index of the center of 2-generated finite p-groups with cyclic derived subgroup in terms of the order of its derived subgroup.

Keywords: Capable group, Derived subgroup, Center factor.

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1 Introduction

A group G is called capable if there exists a group H such that $G \cong H/Z(H)$. Capability plays an important role in P. Hall's classification scheme for p-groups up to isoclinism [2]. It is really very interesting to find the relation between the concept of capability and "the Schur's theorem". Schur [4] proved that the finiteness of $G/Z(G)$ implies the finiteness of $\gamma_2(G)$. A natural question which arises here is when the converse of the theorem of Schur does hold? Infinite extra special groups show that the converse of the Schur's theorem does not hold in general. I. M. Isaacs found the relationship between the capable groups and the converse the Schur's theorem. Isaacs in [3] proved :

Theorem 1.1. *Let G be a capable group and $|\gamma_2(G)| = n$ then $|G : Z(G)|$ is bounded above by some function f of n .*

In fact he showed that the converse of the Schur's theorem holds for the capable groups. We focus our attention on results of Isaacs in [3]. We state the same results under new hypotheses and other results as follows.

2 Main results

First, we recall the following lemmas from [3].

*Will be presented in English

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