**Zentralblatt–MATH**


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**Hewitt, P.R.**
*Extensions of residually finite groups.* (English)
J. Algebra 163, No.3, 757-772 (1994).

The author investigates the problem of the residual finiteness of extensions of residually finite groups. The following theorem is proved: "Let $G = \mathrm{SL}_d(\mathbf{Z})$, and $M = \mathbf{Z}^d$ its natural module. (1) If $d = 2$, then every extension of $G$ over $M$ – or any other residually finite $G$-group – is residually finite. (2) If $d = 3$, then $H^2(G, M) = \mathbf{Z}/2^t \oplus \mathbf{Z}$, for some positive integer $t$. Moreover, a 2-class determines a residually finite extension if and only if it is a torsion class. (3) If $d > 3$, but $d \neq 5$, then $H^2(G, M) = 0$." From the other results we mention only one. An extension $E$ of $G$ over $M$ is said to be virtually split if there is a subgroup of finite index in $E$ that contains and is split over $M$. For a residually finite $G$-group $M$ and an extension $E$ of $G$ over $M$ the author proves that $E$ is residually finite if and only if $E$ is residually virtually split.

*A.I.Budkin (Barnaul)*

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