ON THE STRUCTURE OF A FINITARY LINEAR GROUP

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Let $FL_\nu(K)$ be a finitary linear group of degree ν over a ring K, and let K be an associative ring with the unit. We study periodic subgroups of $FL_\nu(K)$ in the cases when K is an integral ring (Theorem 1) and a commutative Noetherian ring (Theorem 2). In both cases we prove that the periodic subgroups of $FL_\nu(K)$ are locally finite and describe their normal structure. In Theorem 3 we describe the structure of finitely generated solvable subgroups of $FL_\nu(K)$ if K is an integral ring, a commutative Noetherian ring, or an arbitrary commutative ring. We show that this structure is most complicated in the latter case.

Keywords: finitary linear group, commutative Noetherian ring, locally finite group.

REFERENCES

1. Dixon M.R., Kurdachenko L.A., Otal J. On the structure of some infinite dimensional linear groups. *Commun. Algebra*, 2017, vol. 45, no. 1, pp. 234–246. doi:10.1080/00927872.2016.1175593 .

2. Kurdachenko L.A., Muñoz-Escolano J.M., Otal J. Antifinitary linear groups. *Forum Math.*, 2008, vol. 20, no. 1, pp. 27–44. doi:10.1515/FORUM.2008.002 .

3. Kurdachenko L.A., Muñoz-Escolano J.M., Otal J. Locally nilpotent linear groups with the weak chain conditions on subgroups of infinite central dimension. *Publ. Mat.*, 2008, vol. 52, no. 1, pp. 151–169.

4. Dashkova O.Yu., Dixon M.R., Kurdachenko L.A. Linear groups with rank restrictions on the subgroups of infinite central dimension. *J. Pure Appl. Algebra*, 2007, vol. 208, no. 3, pp. 785–795.
doi: 10.1016/j.jpaa.2006.04.002 .

5. Dixon M.R., Evans M.J., Kurdachenko L.A. Linear groups with the minimal condition on subgroups of infinite central dimension. *J. Algebra*, 2004, vol. 277, no. 1, pp. 172–186.
doi: 10.1016/j.jalgebra.2004.02.029 .

6. Kurdachenko L.A., Subbotin I.Ya. Linear groups with the maximal condition on subgroups of infinite central dimension. *Publ. Mat.*, 2006, vol. 50, no. 1, pp. 103–131.

7. Dashkova O. Yu. Solvable infinite-dimensional linear groups with restrictions on the nonabelian subgroups of infinite rank. *Sib. Math. J.*, 2008, vol. 49, no. 6, pp. 1023–1033.
doi: 10.1007/s11202-008-0098-5 .

8. Dashkova O. Yu. Infinite-dimensional linear groups with restrictions on subgroups that are not soluble A_3-groups. *Algebra Logic*, 2007, vol. 46, no. 5, pp. 297–302. doi: 10.1007/s10469-007-0030-2 .

9. Dashkova O. Yu. Locally soluble infinite-dimensional linear groups with restrictions on nonabelian subgroups of infinite ranks. *Algebra Logic*, 2008, vol. 47, no. 5, pp. 340–347.
doi: 10.1007/s10469-008-9025-x .

10. Merzlyakov Yu. I. Equisubgroups of unitriangular groups: A criterion for selfnormalizability. *Russ. Acad. Sci., Dokl., Math.*, 1995, vol. 50, no. 3, pp. 507–511.

11. Levchuk V.M. Some locally nilpotent rings and their adjoined groups. *Math. Notes*, 1987, vol. 42, no. 5, pp. 848–853. doi:10.1007/BF01137426 .

12. Wehrfritz B.A.F. *Infinite linear groups*. Berlin, Heidelberg, N. Y., Springer-Verlag, 1973, 229 p. ISBN: 3-540-06132-0 .

13. Kargapolov M.I., Merzljakov Ju.I. *Fundamentals of the theory of groups*. Transl. from the 2nd Russian ed., N. Y., Heidelberg, Berlin, Springer-Verlag, 1979, Ser. Graduate Texts in Math., vol. 62, 203 p. ISBN: 978-1-4612-9966-0 . Original Russian text (1st ed.) published in M.I. Kargapolov, Yu.I. Merzlyakov *Osnovy teorii grupp*, Moscow, Nauka Publ., 1972, 240 p.

14. Kurosh A.G. *Group theory.* Moscow: Nauka, 1967, 648 p. Transl. from the 2nd Russian ed., N. Y., Chelsea Publ. Co., 1960, vol. 1, 272 p. ISBN: 978-0828401074 , vol. 2: 308 p. ISBN: 978-0821834770 .

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