

## Evgenii L. Bashkirov

### *Two remarks on Lie rings of $2 \times 2$ matrices over commutative associative rings*

Comment.Math.Univ.Carolin. 61,1 (2020) 1–10.

**Abstract:** Let  $C$  be an associative commutative ring with 1. If  $a \in C$ , then  $aC$  denotes the principal ideal generated by  $a$ . Let  $l, m, n$  be nonzero elements of  $C$  such that  $mn \in lC$ . The set of matrices  $\begin{pmatrix} a_{11} & a_{12}a_{21} \\ -a_{11} & \end{pmatrix}$ , where  $a_{11} \in lC$ ,  $a_{12} \in mC$ ,  $a_{21} \in nC$ , forms a Lie ring under Lie multiplication and matrix addition. The paper studies properties of these Lie rings.

**Keywords:** Lie ring; associative commutative ring; matrix

**AMS Subject Classification:** 17B05

#### REFERENCES

- [1] Bashkirov E. L., *On a class of Lie rings of  $2 \times 2$  matrices over associative commutative rings*, Linear Multilinear Algebra **67** (2019), no. 3, 456–478.
- [2] Bashkirov E. L., Pekönür E., *On matrix Lie rings over a commutative ring that contain the special linear Lie ring*, Comment. Math. Univ. Carolin. **57** (2016), no. 1, 1–6.
- [3] Borevich, A. I., Shafarevich I. R., *Number Theory*, Pure and Applied Mathematics, 20, Academic Press, New York, 1966.
- [4] Ireland K., Rosen M., *A Classical Introduction to Modern Number Theory*, Graduate Texts in Mathematics, 84, Springer, New York, 1990.
- [5] Koibaev V. A., Nuzhin Ya. N., *Subgroups of Chevalley groups and Lie rings of definable by a collection of additive subgroups of the original ring*, Fundam. Prikl. Mat. **18** (2013), no. 1, 75–84 (Russian. English, Russian summary); translated in J. Math. Sci. (NY) **201** (2014), no. 4, 458–464.
- [6] Nuzhin Ya. N., *Lie rings defined by the root system and family of additive subgroups of the initial ring*, Proc. Steklov Inst. Math. **283** (2013), suppl. 1, S119–S125.