

$t$ -SMALL ELEMENTS ON LATTICES

Celil Nebiyev<sup>1</sup> and Hasan Hüseyin Ökten<sup>2</sup>

<sup>1</sup>*Department of Mathematics, Ondokuz Mayıs University 55270  
Kurupelit-Atakum/Samsun/TURKEY*

<sup>2</sup>*Technical Sciences Vocational School, Amasya University, Amasya/TURKEY*

ABSTRACT. In this work all lattices are complete modular lattices. Let  $L$  be a lattice and  $t \in L$ . An element  $a$  of  $L$  is called  $t$ -small in  $L$ , denoted by  $a \ll_t L$ , in case for any element  $b$  of  $L$ ,  $t \leq a \vee b$  implies that  $t \leq b$ . In this work, some properties of these elements are investigated.

**Results**

**Proposition 1.1.** *Let  $L$  be a lattice and  $a \in L$ . Then  $a \ll_1 L$  if and only if  $a \ll L$ .*

**Proposition 1.2.** *Let  $L$  be a lattice,  $a, t \in L$  and  $a \leq t$ . Then  $a \ll_t L$  if and only if  $a \ll t/0$ .*

**Proposition 1.3.** *Let  $L$  be a lattice and  $t, a_1, a_2 \in L$ . If  $a_1 \ll_t L$  and  $a_2 \ll_t L$ , then  $a_1 \vee a_2 \ll_t L$ .*

---

2000 *Mathematics Subject Classification* 06C05, 06C15.

Key words and phrases: **Lattices, Small Elements, Small Submodules,  $T$ -Small Submodules.**

E-mail addresses: <sup>1</sup>cnebiyev@omu.edu.tr , <sup>2</sup>hokten@gmail.com .

### References

- [1] R. Beyranvand and F. Moradi, Small Submodules with Respect to an Arbitrary Submodules, *Journal of Algebra and Related Topics*, 3 No 2, 43-51 (2015).
- [2] G. Călugăreanu, *Lattice Concepts of Module Theory*, Kluwer Academic Publisher, Dordrecht, Boston, London, 2000.
- [3] J. Clark, C. Lomp, N. Vanaja, R. Wisbauer, *Lifting Modules Supplements and Projectivity In Module Theory*, Frontiers in Mathematics, Birkhauser, Basel, 2006.
- [4] R. Wisbauer, *Foundations of Module and Ring Theory*, Gordon and Breach, Philadelphia, 1991.