

GAP algorithms for finite abelian groups and applications

SEPTIMIU CRIVEI and GABRIELA OLTEANU

ABSTRACT.

We propose GAP algorithms which determine finite abelian groups or subgroups of them having certain properties of lattice-theoretic nature. We also show their usefulness for obtaining examples and some theoretical results.

REFERENCES

- [1] Clark, J., Lomp, C., Vanaja, N. and Wisbauer, R., *Lifting modules. Supplements and projectivity in module theory*, Birkhäuser, Basel, 2006
- [2] Crivei, S., Olteanu, G. and Şuteu-Szöllösi, Ş., *ELISA - A collection of GAP algorithms related to extending and lifting abelian groups*. <http://www.gap-system.org/Packages/undep.html> and http://math.ubbcluj.ro/~crivei/GAP_project.
- [3] Crivei, S. and Şuteu-Szöllösi, Ş., *Subgroup lattice algorithms related to extending and lifting abelian groups*, Int. Electron. J. Algebra **2** (2007), 54–70
- [4] Dauns, J. and Zhou, Y., *Classes of modules*, Chapman and Hall/CRC, Boca Raton, 2006
- [5] Dung, N. V., Huynh, D. V., Smith, P. F. and Wisbauer, R., *Extending modules*, Longman Scientific & Technical, Harlow, 1994
- [6] Fuchs, L., *Infinite abelian groups, I*, Academic Press, New York, London, 1970
- [7] Gorenstein, D., *Finite groups*, Second Edition, Chelsea Publishing Co., New York, 1980
- [8] Mermut, E., *Homological approach to complements and supplements*, Ph. D. thesis, Dokuz Eylül University, Izmir, 2004
- [9] Smith, P. F., *Modules for which every submodule has a unique closure*, in *Proceedings of the Biennial Ohio State – Denison Conference*, May 1992, 302–313
- [10] Wisbauer, R., *Foundations of module and ring theory*, Gordon and Breach, Reading, 1991
- [11] The GAP Group, *GAP – Groups, Algorithms, and Programming, Version 4.4*; 2006. <http://www.gap-system.org>.

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
"BABEŞ-BOLYAI" UNIVERSITY
M. KOGĂLNICEANU 1, 400084 CLUJ-NAPOCA, ROMANIA
E-mail address: crivei@math.ubbcluj.ro

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
NORTH UNIVERSITY OF BAIA MARE
VICTORIEI 76, 430122 BAIA MARE, ROMANIA
E-mail address: golteanu@ubm.ro

Received: 26.10.2008; In revised form: 14.12.2008; Accepted: 23.03.2009

2000 *Mathematics Subject Classification*. 20K01, 20E15, 68W30.

Key words and phrases. *Finite abelian group, closed subgroup, closure, type subgroup, Hall subgroup.*

The second author acknowledges the support of the Romanian grant PN-II-ID-PCE-2007-1 project ID_532, contract no. 29/28.09.2007.