

## FILTERS OF LATTICES WITH RESPECT TO A CONGRUENCE

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### Abstract

Some properties of filters on a lattice  $L$  are studied with respect to a congruence on  $L$ . The notion of a  $\theta$ -filter of  $L$  is introduced and these filters are then characterized in terms of classes of  $\theta$ . For distributive  $L$ , an isomorphism between the lattice of  $\theta$ -filters of  $L$  and the lattice of filters of  $L_{/\theta}$  is obtained.

**Keywords:** congruence, filter, closure operator,  $\theta$ -filter, congruence lattice.

**2010 Mathematics Subject Classification:** 06D99.

### REFERENCES

- [1] R. Balbes and P. Dwinger, Distributive Lattices (University of Missouri Press, Columbia, Mo., 1974).
- [2] G. Birkhoff, Lattice Theory (Amer. Math. Soc. Colloq. XXV, Providence, USA, 1967).
- [3] T.S. Blyth, *Ideals and filters of pseudo-complemented semi-lattices*, Proc. Edinburgh Math. Soc. **23** (1980) 301–316. doi:10.1017/S0013091500003850
- [4] B.A. Davey and H.A. Priestley, Introduction to Lattice and Order (Cambridge University Press, USA, 2002). doi:10.1017/CBO9780511809088

- [5] G. Grätzer and E.T. Schmidt, *Ideals and congruence relations in lattices*, Acta Math. Acad. Sci. Hungary **9** (1958) 137–175. doi:10.1007/BF02023870
- [6] G. Grätzer and E.T. Schmidt, *On congruence relations of lattices*, Acta Math. Acad. Sci. Hungary **13** (1962) 179–185. doi:10.1007/BF02033636
- [7] T.P. Speed, *Two congruences on distributive lattices*, Bulletin de la Societe Royale des Sciences de Liege, **38<sup>e</sup>** (3–4) (1969) 86–95.

Received 21 September 2014  
First Revision 5 October 2014  
Second Revision 20 October 2014