

POINTED PRINCIPALLY ORDERED REGULAR SEMIGROUPS

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Abstract

An ordered semigroup S is said to be *principally ordered* if, for every $x \in S$ there exists $x^* = \max \{y \in S \mid xyx \leq x\}$. Here we investigate those principally ordered regular semigroups that are *pointed* in the sense that the classes modulo Green's relations \mathcal{L} , \mathcal{R} , \mathcal{D} have biggest elements which are idempotent. Such a semigroup is necessarily a semiband. In particular we describe the subalgebra of $(S; *)$ generated by a pair of comparable idempotents that are \mathcal{D} -related. We also prove that those \mathcal{D} -classes which are subsemigroups are ordered rectangular bands.

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REFERENCES

- [1] T.S. Blyth, *Lattices and Ordered Algebraic Structures* (Springer, 2005). doi:10.1007/b139095
- [2] T.S. Blyth and M.F. Janowitz, *Residuation Theory* (Pergamon, 1972).
- [3] T.S. Blyth and G.A. Pinto, *Principally ordered regular semigroups*, *Glasgow Math. J.* **32** (1990) 349–364. doi:10.1017/S0017089500009435

- [4] T.S. Blyth and G.A. Pinto, *Idempotents in principally ordered regular semigroups*, Communications in Algebra **19** (1991) 1549–1563. doi:10.1080/00927879108824220
- [5] T.S. Blyth and M.H. Almeida Santos, *On weakly multiplicative inverse transversals*, Proc. Edinburgh Math. Soc. **37** (1993) 93–99. doi:10.1017/S001309150001871X
- [6] P.M. Higgins, *Techniques of Semigroup Theory* (Oxford Science Publications, 1992). doi:10.1007/BF02573500

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