Admissible Extensions of Clifford Semigroups by Groups

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Motivated by the desire to interpret the second partial cohomology groups in terms of normal extensions, M. Dokuchaev and M. Khrypchenko introduced in [1] the notion of an admissible extension S of a Clifford semigroup K by a group. It is well known, that such a normal extension is equivalent to a pair (S, ρ), where ρ is a group congruence on S. A normal extension is *admissible*, if the idempotent separating congruence $\rho^{\min}$ has an order-preserving transversal. Earlier we characterized admissible extensions applying fundamental concepts of the structure theory of inverse semigroups (see [2]): using the inverse semigroup $C(S)$ of all permissible subsets of S, a normal extension (S, ρ) is admissible if and only if the congruence $C(\rho)$ expanding ρ to $C(S)$ is a Billhardt congruence.

In the 1980s, M. Petrich developed a general framework for studying normal extensions of inverse semigroups (see [3]). For an inverse semigroup K, the *normal hull* $\Phi(K)$ consists of the isomorphisms among the subsemigroups of K of the form eKe where e is any idempotent of K. Every normal extension (S, ρ) gives rise to a canonical homomorphism $\theta(S : K)$ of S into $\Phi(K)$ whose Kernel $M(S : K)$ and image $T(S : K)$ are called the *metacenter* and *type* of the extension, respectively. We use these parameters to describe an admissible extension (S, ρ) of a Clifford semigroup by a group.

[1] M. Dokuchaev, M. Khrypchenko, Twisted partial actions and extensions of semilattices of groups by groups, *International Journal of Algebra and Computation* **27** (2017), 887–933.

[2] M. V. Lawson, *Inverse Semigroups: The Theory of Partial Symmetries*, World Scientific, Singapore, 1998.

[3] M. Petrich, *Inverse Semigroups*, John Wiley & Sons, United States of America, 1984.