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Corrigendum

Corrigendum to "Partial cohomology of groups" [J. Algebra 427 (2015) 142–182]

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ABSTRACT

We prove a corrected version of [1, Theorem 5.4].
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Our aim is to correct an inaccuracy in [1, Lemma 5.3] which resulted in a flaw in [1, Theorem 5.4]. To this end, let us introduce some notations, most of which were used in [1] (for the inverse semigroup terminology see the monograph [4]). Given an inverse semigroup S, we denote by σ_S the minimum group congruence on S and by $\mathcal{G}(S)$ the

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maximum group image S/σ_S of S. The σ_S-class of an element $s \in S$ (seen as a subset of S) will be denoted by $\sigma_S(s)$, and $\sigma_S^\natural$ will stand for the natural epimorphism $S \to \mathcal{G}(S)$. We also recall that the Exel's monoid [2] of a group G is the universal semigroup $\mathcal{S}(G)$ generated by the symbols $[g]$, $g \in G$, modulo the relations

(i) $[g^{-1}][g][h] = [g^{-1}][gh]$;
(ii) $[g][h][h^{-1}] = [gh][h^{-1}]$;
(iii) $[g][1_G] = [g]$.

The elements $\varepsilon_g = [g][g^{-1}]$ are commuting idempotents of $\mathcal{S}(G)$, and each $s \in \mathcal{S}(G)$ can be represented as $\varepsilon_{h_1} \dots \varepsilon_{h_n}[g]$, where $n \geq 0$, $h_i \neq h_j$ for $i \neq j$ and $h_i \notin \{1_G, g\}$ for all i. Moreover, such a representation of s is unique up to a permutation of the idempotents ε_{h_i} (see [2, Propositions 2.5 and 3.2]). It is well-known [3] that $\mathcal{S}(G)$ is a max-generated [5] F-inverse monoid, where $\max \sigma_{\mathcal{S}(G)}(\varepsilon_{h_1} \dots \varepsilon_{h_n}[g]) = [g]$ and $\mathcal{G}(\mathcal{S}(G)) \cong G$.

First, we would like to make some comments on [1, Lemma 5.1], whose statement we reproduce here with some slight modification in notations and the specification of $\tilde{\pi}$ in (ii).

Lemma 1 *(Lemma 5.1 from [1]). For an epimorphism $\pi : S \to T$ of inverse semigroups the following are equivalent:*

(i) $\ker \pi \subseteq \sigma_S$*;*
(ii) $\tilde{\pi} : \mathcal{G}(S) \to \mathcal{G}(T)$ *mapping* $\sigma_S^\natural(s)$ *to* $\sigma_T^\natural(\pi(s))$ *is an isomorphism.*

Moreover, in this case

$$\pi(\sigma_S(s)) = \sigma_T(\pi(s)) \tag{1}$$

for all $s \in S$*.*

Observe that if S and T are F-inverse monoids and $\pi : S \to T$ is an epimorphism satisfying (1), then

$$\pi(\max \sigma_S(s)) = \max \sigma_T(\pi(s)). \tag{2}$$

Indeed, π, being a homomorphism, respects the natural partial orders on S and T, and since by (1) any $t \in \sigma_T(\pi(s))$ is of the form $\pi(s')$ for some $s' \in \sigma_S(s)$, we have that $t = \pi(s') \leq \pi(\max \sigma_S(s))$.

The following lemma, proved in [1], had a mistake in the "uniqueness" part of its statement.

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