

Erratum to: On additively regular seminearrings

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An error, in *Section 3* of our paper [1], has come to our notice recently. This can be rectified firstly by replacing throughout the section ‘full right k -ideal’ and ‘full k -ideal’ by ‘normal full right k -ideal’ and ‘normal full k -ideal’, respectively. The definitions of normal full right k -ideal and normal full k -ideal can be given as follows and can be considered to be an extension of *Definition 3.10* of [1].

Definition 3.10 (*Extended [1]*) In an additively inverse seminearring $(S, +, \cdot)$, a full right (left) k -ideal H is said to be normal full right (left) k -ideal if $a + h + a^* \in H$ for all $h \in H$ and for all $a \in S$. The definition of normal full k -ideal is obvious.

The second step for the rectification of the error is accomplished by providing (see below) a minor correction in the proofs of *Propositions 3.11* and *3.12*. For other results such as *Propositions 3.16* and *3.17*, *Theorems 3.19* and *3.20* the necessary corrections are obvious and so we omit them.

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Proposition 3.11 ([1], corrected version) *Let S be an additively inverse seminearring and H be a normal full right k -ideal of S . Then the relation ρ , defined on S , by*

$$a\rho b \text{ if and only if } a + b^* \in H,$$

is a right normal congruence on S . Moreover $H = \{a \in S : a\rho e \text{ for some } e \in E^+(S)\}$.

Proof Under the previous hypothesis ρ was lacking the following property of being left compatible with respect to addition. Now we prove this as follows. Let $a\rho b$ and $c \in S$. Then $(c + a) + (c + b)^* = c + a + b^* + c^*$ where $a + b^* \in H$. Hence by the hypothesis $(c + a) + (c + b)^* \in H$ whence $(c + a)\rho(c + b)$. \square

Proposition 3.12 ([1], corrected version) *Let ρ be a right normal congruence on an additively inverse seminearring S . Then $H := \{a \in S : a\rho e \text{ for some } e \in E^+(S)\}$ is a normal full right k -ideal of S . Moreover, the relation σ , defined on S , by*

$$a\sigma b \text{ if and only if } a + b^* \in H,$$

coincides with ρ .

Proof It has already been proved in [1] that H is a full right k -ideal of S . We now prove that H is a normal full right k -ideal. Let $h \in H$. Then there exists $e \in E^+(S)$ such that $h\rho e$. Let $x \in S$. Then $x + e + x^* \in E^+(S)$. Now as $h\rho e$, $(x + h + x^*) \rho (x + e + x^*)$ using the compatibility of ρ with respect to addition. Therefore $x + h + x^* \in H$. \square

Now for the other results of the said section [1] requiring correction we only provide below the corrected statements as the necessary corrections in the proof are easy to understand as they follow in a manner similar to that of either *Proposition 3.11* or *Proposition 3.12*(corrected versions) given above.

Proposition 3.16 ([1], corrected version) *Let S be a distributively generated additively inverse seminearring with property D . Let H be a normal full k -ideal of S . Then the relation σ , defined by*

$$a\sigma b \text{ if and only if } a + b^* \in H \text{ and } ca + (cb)^* \in H \text{ for all } c \in S,$$

is a normal congruence on S . Moreover $H = \{a \in S : a\sigma e \text{ for some } e \in E^+(S)\}$.

Proposition 3.17 ([1], corrected version) *Let S be a distributively generated additively inverse seminearring with property D and let ρ be a normal congruence on S . Then $H := \{a \in S : a\rho e \text{ for some } e \in E^+(S)\}$ is a normal full k -ideal of S . Moreover, the relation σ on S defined by*

$$a\sigma b \text{ if and only if } a + b^* \in H \text{ and } ca + (cb)^* \in H \text{ for all } c \in S,$$

coincides with ρ .

Theorem 3.19 ([1], corrected version) *Let $(S, +, \cdot)$ be an additively inverse seminearring. Let $\mathcal{I}_{\mathcal{R}}(S)$ be the set of all right normal congruences on S and $\mathcal{J}_{\mathcal{R}}(S)$ be the set of all normal full right k -ideals of S . Then $\mathcal{I}_{\mathcal{R}}(S)$ and $\mathcal{J}_{\mathcal{R}}(S)$ are in an inclusion preserving bijective correspondence via the map $\phi : \rho \mapsto H_{\rho}$, where $H_{\rho} := \{a \in S : a \rho e \text{ for some } e \in E^+(S)\}$.*

Theorem 3.20 ([1], corrected version) *Let $(S, +, \cdot)$ be a distributively generated additively inverse seminearring with property D . Let $\mathcal{I}_{\mathcal{C}}(S)$ be the set of all normal congruences on S and $\mathcal{J}_{\mathcal{C}}(S)$ be the set of all normal full k -ideals of S . Then there exists an inclusion preserving bijection between $\mathcal{I}_{\mathcal{C}}(S)$ and $\mathcal{J}_{\mathcal{C}}(S)$ via the map $\phi : \rho \mapsto H_{\rho}$, where $H_{\rho} := \{a \in S : a \rho e \text{ for some } e \in E^+(S)\}$.*

Remark 3.23 ([1], corrected version) Theorem 3.22 together with Theorem 3.20 implies that H_{σ} is the least normal full k -ideal of S .

Reference

1. Sardar, S.K., Mukherjee, R.: On additively regular seminearrings. *Semigroup Forum* **88**(3), 541–554 (2014)