A NOTE ON THE STRUCTURE OF IDEALS IN A EUCLIDEAN SEMIRING

By Louis Dale

In the paper “The Structure of Ideals in a Euclidean Semiring,” appearing in this Journal Volume 17, Number 1, June 1977, pp. 21–29, there is an error in the statement of theorem 11. This theorem stated as follows:

Let $A$ be an ideal in $E$ and $a \in A$. If $d$ divides $a$ and $a+d \in A$, then $dT_a \subseteq A$. The ideal $dT_a$ in the theorem should be $dT_a$. The correct statement of the theorem (with proof) is as follows.

**THEOREM.** Let $A$ be an ideal in $E$ and $a \in A$. If $d$ divides $a$ and $a+d \in A$, then $dT_a \subseteq A$.

**PROOF.** Let $a=dm$ and $x \in dS[a^2, a(a+e)]$. Then $dS[a^2, a(a+e)] = dS[d^2m^2, d^2m^2 + dm]$ and it follows that $x = d^3m^2 + z$ where $\phi(z) \leq \phi(d^2m)$ and $d$ divides $z$. Hence $z = kd$ for some $k \in E$. Now $d^2m = pz + r$ where $\phi(r) < \phi(z)$ or $r = 0$ and since $E$ is a principal semiring, we have both $d = f + e$ and $p = q + e$ for some $f, q \in E$. All of this gives

$$x = d^3m^2 + z = dm(pz + r) + z = a(pz + r) + z = (apz + z) + ar$$

$$= k(a(pz + r) + z = k[a(f + e)(q + e) + d] + ar$$

Since $a \in A$ and $a+d \in A$, it follows that $x \in A$. Consequently, $dS[a^2, a(a+e)] \subseteq A$ and it follows from lemma 10 that $dT_a \subseteq A$.

It should be noted that theorem 11 is a generalization of lemma 6 which states: Let $A$ be an ideal in a Euclidean semiring $E$. If there exists $a \in A$ such that $a + e \in A$, then $T_a \subseteq A$.

It should also be noted that on page 28 line four (4) from the bottom the set $V = \{ \rho | dT_p \subseteq A \}$ should be $V = \{ \rho | kT_p \subseteq A \}$ where $k \in W$ such that $\phi(k)$ is minimum.

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REFERENCES