MR1657259 (99i:68075) 68Q45

Honkala, Juha (FIN-TURK)

Decision problems concerning a power series generalization of DT0L systems. (English. English summary)

Fund. Inform. **32** (1997), *no.* 3-4, 341–348.

Let Σ be an alphabet, A a commutative semiring, and $A\langle\Sigma^*\rangle$ the A-semialgebra of formal polynomials with noncommuting variables from Σ and coefficients from A. A 3-tuple $G = (\Sigma, H, v)$ is a "DT0L system with multiplicities in A" if $v \in A\langle\Sigma^*\rangle$ is a nonzero monomial and $H = \{h_1, \cdots, h_n\}$, where $h_1, \cdots, h_n \colon A\langle\Sigma^*\rangle \to A\langle\Sigma^*\rangle$ are monomial morphisms (i.e., for each $\sigma \in \Sigma$ there exist a nonzero $a \in A$ and a $w \in \Sigma^*$ such that $h_i(\sigma) = aw$ for $1 \leq i \leq n$). The mapping $S(G) \colon H^* \to A\langle\Sigma^*\rangle$, defined by $S(G)(u) = u(v)$, is the "DT0L sequence with multiplicities generated by G".

The author establishes (i) a general result (that each recursively enumerable set over $\mathbf{N}$ can be characterized via a multiplicity sequence defined by a DT0L system with multiplicities in $\mathbf{Q}$), which suggests that most questions concerning DT0L power series and multiplicity sequences are undecidable, and—to the contrary—(ii) the sequence equivalence problem (i.e., "Is $S(G_1) = S(G_2)$?") is decidable for DT0L systems with multiplicities in $\mathbf{Q}$. *Peter R. J. Asveld* (NL-TWEN-C)