Sur les mots ultimement périodiques des langages rationnels de mots infinis. (French. English, French summary) [On ultimately periodic words of rational \(\omega\)-languages]


For each alphabet \(\Sigma\), let \(\Sigma^*, \Sigma^+,\) and \(\Sigma^\omega\) be, respectively, the sets of finite, nonempty finite, and infinite words over \(\Sigma\). If \(L\) is a subset of \(\Sigma^\omega\), then the language \(L_S\) is defined by \(L_S = \{uv \mid uv\omega \in L\}\). First the authors show that if \(L\) is a rational subset of \(\Sigma^\omega\), then \(L_S\) is a rational language over \(\Sigma \cup \{\}\). Next the language \(L_S\) is characterized as follows. The equivalence relation \(\equiv\) on \(\Sigma^*\Sigma^+\) is defined by \(u\Sigma v \equiv x\Sigma y\) if and only if \(uv\omega = xy\omega\). Then for each subset \(K\) of \(\Sigma^*\Sigma^+\) there exists a rational subset \(L\) of \(\Sigma^\omega\) such that \(L_S = K\) if and only if \(K\) is rational and saturated by \(\equiv\) (we say that \(K\) is saturated by \(\equiv\) if \([u]\Sigma[v] \cap K \neq \emptyset\) implies \([u]\Sigma[v] \subseteq K\).

Finally, the languages of \(L\) and \(L_S\) are related in terms of the corresponding syntactic congruences.

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