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Refining the hierarchy of blind multicounter languages and twist-closed trios. (English. English summary)

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A k -counter automaton M is a one-way nondeterministic machine which has k counters (each of which is allowed to hold a positive or negative integer) and accepts by final state with all k counters equal to zero. And M is called “blind” if its action only depends on the current state and input but not on the counters’ contents. The i -th counter ($1 \leq i \leq k$) of such a blind M is “reversal-bounded” iff its contents $C_i(t)$ as functions of time t satisfy: $C_i(t) > C_i(t_1)$ implies $C_i(t_1) \geq C_i(t_2)$, where $t < t_1 \leq t_2$.

The authors study the families (k, r) -RBC of languages accepted in quasi-realtime by one-way counter automata having k blind counters of which at least r are reversal-bounded. They show that these families constitute a strict hierarchy of semiAFLs, generalizing some results of S. A. Greibach [*Theoret. Comput. Sci.* 7 (1978), no. 3, 311–324; MR0513714 (80e:68147)]. Then they consider the monadic operation twist on languages [M. Jantzen, in *STACS 98 (Paris, 1998)*, 344–355, Lecture Notes in Comput. Sci., 1373, Springer, Berlin, 1998; MR1650690 (99i:68076)] in relation to the semiAFLs of languages accepted by multicounter and multipushdown automata restricted to reversal-bounded computations. For example, they prove that the family (k, r) -RBC is twist-closed if and only if $r = 0$, and they characterize the family $\mathcal{M}_{\cap}(P)$ of languages accepted in quasi-realtime by nondeterministic one-way reversal-bounded multipushdown automata as the least twist-closed trio $\mathcal{M}_{\text{twist}}(P)$ generated by the language P of palindromes over two symbols.

This paper is an extension of the authors’ earlier contribution [in *STACS 2001 (Dresden)*, 376–387, Lecture Notes in Comput. Sci., 2010, Springer, Berlin, 2001; MR1890806 (2003b:68119)].

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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