Note

Some properties of space-bounded synchronized alternating Turing machines with universal states only*

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1. Preliminaries

During the past years many models of parallel computations have arisen. One of them – alternation – was introduced in [1] as a generalization of nondeterminism. Several types of alternating machines have been introduced and many results about them have been established. Among the most interesting modifications are the alternating machines with universal states only (here, universally branching Turing machines). They were investigated by Inoue et al. [7–10]. These models are more realistic parallel computation models than ordinary alternating Turing machines because of the elimination of nondeterminism.

Another modification of an alternating machine was motivated by the fact that this model does not provide communication among the parallel processes during the computation. Based on the alternation, a more general notion – synchronized alternation – enabling a simple form of communication, via states, was introduced in [3] and for the first time investigated in [11, 12]. The results obtained show a great power of synchronization. For example, one blind counter suffices for a synchronized alternating machine to recognize any recursively enumerable set.

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