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Spinal-formed context-free tree grammars. (English. English summary)

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The authors introduce a restricted variant of context-free tree grammars called spine grammars. Their (technically rather complicated) condition concerns the structure of the right-hand sides of the production rules; it results, among other things, in the fact that applying a rule $B(x_1, \dots, x_n) \rightarrow \beta$ to a derivation tree α yields a derivation tree whose spine is a well-formed combination of the spines of α and β .

For this grammatical model the authors establish (i) a few normal forms, and (ii) the fact that, with respect to string generating power, spine grammars are equivalent to the tree adjoining grammars of A. K. Joshi, L. S. Levy and M. Takahashi [*J. Comput. System Sci.* **10** (1975), 136–163; MR0363014 (50 #15452)]. As a consequence of (ii), spine grammars may be relevant in describing natural languages.

The last part of the paper provides a machine characterization in terms of pushdown tree automata (PDTAs) as introduced by I. Guessarian [*Math. Systems Theory* **16** (1983), no. 4, 237–263; MR0721100 (85c:68053)]. A PDTA is a combination of an ordinary pushdown automaton and a tree automaton: it is a generalization of a top-down tree automaton which processes the input tree from the root and duplicates the pushdown stack as it moves down on the input. The authors limit the PDTA model to linear PDTA by a restriction on duplicability for the pushdown stacks and they show that linear PDTAs accept exactly the class of tree languages generated by spine grammars.
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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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