Meeting: 1007, Santa Barbara, California, AMS CP 1, Session for Contributed Papers

1007-03-55 **Mark Burgin***, Department of Mathematics, UCLA, Los Angeles, 90095. *Complexity of grammars with prohibition.* Preliminary report.

We fix a finite alphabet A and consider languages and grammars with this alphabet.

Definition 1. A formal grammar G with prohibition consists of rules that are divided into two parts: positive PG and negative NG. These rules generate in a conventional manner, i.e., by derivation or recursive inference, two languages $L(PG)$ and $L(NG)$.

Definition 2. The language $L(G)$ of the grammar G with prohibition is equal to $L(PG) \setminus L(NG)$.

Definition 3. A language L is recursive/recursive if both $L(PG)$ and $L(NG)$ are recursive.

Theorem 1. A language L is recursive/recursive if and only if it is recursive.

Remark. This property is not always true because in general grammars with prohibition are more powerful than conventional formal grammars from a given class. For instance, enumerable/enumerable language is not always enumerable.

There are recursive languages with arbitrarily high derivational complexity K where K can be time T, space S, dispersion D or index I [A.V. Gladkii, Formal Grammars and Languages, Nauka, 1973].

Theorem 2. For any recursive language L, there is grammar G with prohibition such that $L = L(G)$ and $T(G, n) = O(n), S(G, n) = n, D(G, n) = 1$, and $I(G, n) = 1$. (Received January 18, 2005)