

## TEAMS OF LIMITED AND UNIFORMLY LIMITED OL SYSTEMS

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### ABSTRACT

In [9], teams of cooperating/distributed grammar systems have been introduced. In this paper, in a similar manner we impose the concept of teams to cooperating/distributed limited and uniformly limited OL systems as given in [14] or [17], respectively. The generative power of the underlying systems is enlarged. The families of languages generated by teams of limited and uniformly limited systems are incomparable to one another with respect to inclusion. We also investigate the influence of the number of teams or the number of components in a team.

*Keywords:* formal languages,  $k$ -limited OL systems, uniformly  $k$ -limited OL systems, teams in cooperating/distributed systems.

### 1. Introduction

In [9], teams of cooperating/distributed grammar systems have been introduced (see also [5, pp. 167–169]). The power of the systems is enlarged by allowing several component grammars, a so called team of grammars, to execute a common derivation step on the same sentential form  $w$ . In this manner, the sequential derivation mechanism of grammars is extended. From each component, a production is chosen, and these productions are applied in parallel to  $w$ . We know that by L systems (e. g., see [11]), a fully parallel rewriting is given. Thus, in a natural way we cannot consider teams of different L systems. But in case of limited (see [12]) and uniformly limited (see [13]) OL systems, because of the limitation, different systems can work simultaneously on the same word. In this paper, we impose the concept of teams to cooperating/distributed limited systems as given in [14] or [17], respectively.

In Section 2, the definitions of  $k$ -limited and uniformly  $k$ -limited OL systems are recalled as well as the definitions of the corresponding cooperating/distributed systems. Cooperating/distributed (uniformly) limited OL systems with teams and hybrid teams are introduced in Section 3. In systems with teams, all teams work according to the same mode of derivation while in a system with hybrid teams, different teams may have different modes of derivation. In Section 4 we show that by adding teams we strictly enlarge the generative power of the systems which is enlarged once more if