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ON THE GENERATIVE POWER OF SIMPLE H SYSTEMS

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ABSTRACT

In this paper, we prove that the power of simple H systems of the (2,3) type with permitting contexts and target alphabet is equal to extended H systems with permitting contexts and radius of the rules equal to one. We also prove interesting results on simple extended H systems and extended H systems with forbidden contexts.

Keywords: splicing systems, simple H systems, permitting and forbidden contexts and cardinality of context.

1. Introduction

TOM HEAD [4] initiated a new appealing branch of formal language theory called splicing systems. The basic notion is that of *splicing*, a formal model of the recomb inant behavior of DNA sequences under the influence of restriction enzymes and lygases. A slight modification of this system was called as H system by PĂUN [5].

By adding the notion of terminal alphabet to a H system, we obtain an extended H system [5, 9]. The power of such a system, with the set of splicing rules forming a regular language, turns out to be very large; these systems characterize the family of recursively enumerable languages [1, 7]. In this paper, we concentrate on a specific extended H system having the radius one.

In [6], the notion of simple H systems was introduced. The possibility of permitting contexts and target alphabet for simple H systems was studied in [2] and many interesting results were obtained. In this paper, we study SEH systems of the $(2,3)$ type.

In this paper we prove that the power of SEH system of the $(2,3)$ type with permitting contexts is equivalent to extended H system with radius equal to one and permitting contexts. We also prove interesting results for simple extended H systems with forbidden contexts. This paper also defines a new term called the cardinality of context in extended H systems. We prove that cardinality of context adds no power to EH systems with permitting contexts but plays a very important role in forbidden contexts.