

## ABSTRACT

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Constants and Splicing Systems

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In 1987 Tom Head introduced the splicing system as a mathematical model of the generative capacity of a biological system containing double stranded DNA (dsDNA) and enzymes which perform cutting and pasting operations on dsDNA. He first posed the problem of characterizing splicing languages, and certain subclasses of the splicing languages. We address this problem in several formulations, using Schützenberger’s notion of constant words, and the notion of reflexivity in splicing systems. We show that not every splicing language can be generated by a reflexive splicing system, and that all semi-simple splicing languages are strictly locally testable, as defined by McNaughton and Papert. We also give an algorithm for determining a subclass of splicing languages as defined by Head in 1998, using the Simultaneous Pumping Lemma given by Pixton. Throughout the thesis we discuss the interrelated notions of constants, reflexivity, and splicing languages, and the conjecture that every infinite splicing language must contain infinitely many constant words.