Periodicity in Rectangular Arrays

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Abstract

We say that a nonempty word is primitive if it cannot be written as the power of some other word; that is, a nonempty word $z$ is primitive if it cannot be written in the form $z = w^e$ for some word $w$ and some integer $e \geq 2$.

In this talk, we extend the notion of primitivity to two-dimensional words. We discuss a two-dimensional generalization of the familiar Lyndon-Schützenberger theorem for words, present a method to enumerate the number of primitive words of size $m \times n$, and present a linear time algorithm to test primitivity and to compute the primitive root of a two-dimensional word.

This is a joint work with Jeffrey Shallit.