Scattered subwords and compositions of integers

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Let n, d_1, d_2 and s be positive integers, and $u = x_1x_2 \dots x_n \in \Sigma^n$ a word over the alphabet Σ. A word $v = x_{i_1}x_{i_2} \dots x_{i_s}$, where

$i_1 \geq 1$,
$d_1 \leq i_{j+1} - i_j \leq d_2$, if $j = 1, 2, \dots, s-1$,
$i_s \leq n$,

is a (d_1, d_2)-***subword*** of length s of the word u.

For example, in the word *aabcade* the $(2, 4)$-subwords are abd, ace, ad.

The number of different (d_1, d_2)-subwords of a word is called (d_1, d_2)-***complexity***.

The $(1, d)$-complexity was studied by Iványi [1] and Kása [2], the (d, n)-complexity by Kása [3]. The (d_1, d_2)-complexity is a special case of scattered subword complexity studied by Kása [4].

In this talk we show the correspondence between the (d_1, d_2)-complexity of a rainbow word and the number of compositions of integers. (In rainbow words the letters are pairwise different. Compositions are partitions in which the order of the integers matter too.)

Instead of the polynomial algorithm given for the scatterd subword complexity in [4], we present here a linear algorithm for the case of the (d_1, d_2)-complexity.

References

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