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Nonexistence of a Kruskal-Katona type theorem for subword orders. (English)
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Summary: We consider the poset SO\(_n\) of all words over an \(n\)-element alphabet ordered by the subword relation. It is known that SO(2) falls into the class of Macaulay posets, i.e. there is a theorem of Kruskal-Katona type for SO(2). As the corresponding linear ordering of the elements of SO(2) the vip-order can be chosen.

Daykin introduced the V-order, which generalizes the vip-order to the case \(n \geq 2\). He conjectured that the V-order gives a Kruskal-Katona-type theorem for SO\(_n\).

We show that this conjecture fails for all \(n \geq 3\) by explicitly giving a counterexample. Based on this, we prove that for no \(n \geq 3\) the subword order SO\(_n\) is a Macaulay poset.

MSC:

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05D05 Extremal set theory
68R15 Combinatorics on words

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