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PALINDROMIAL EQUIVALENCE: ONE THEOREM AND TWO PROBLEMS

Let A be an alphabet, A^* be a set of all words in A. A word ν is called a *subword* of a word w if ν can be obtained by striking out some letters from w. For a word $w = a_1a_2\dots a_{n-1}a_n$, put $\tilde{w} = a_na_{n_1}\dots a_2a_1$. A word w is called a *palindrome* if $\tilde{w} = w$.

Given a word $w \in A^*$, denote by $\mathrm{Pal}\,(w)$ the set of all subwords of w that are palindromes. The words ν, w are called *palindromially equivalent* if $\mathrm{Pal}\,(\nu) = \mathrm{Pal}\,(w)$.

Theorem. *Let $|A| = 2$, $\nu, w \in A^*$. Then ν, w are palindromially equivalent if and only if $\nu = w$ or $\nu = \tilde{w}$.*

Problem 1. *Describe the classes of palindromial equivalence on A^* for $|A| = 3$.*

Let $A = \{a, b\}$, $w \in A^*$, $w = a_1a_2\dots a_n$. Put $\bar{a} = b$, $\bar{b} = a$, $\bar{w} = \bar{a}_1\bar{a}_2\dots\bar{a}_n$. A word w is called an *antipalindrome* if $\tilde{w} = \bar{w}$.

Problem 2. *Describe the classes of antipalindromial equivalence on A^*.*

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