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*A length bound for binary equality words*

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**Abstract:** Let  $w$  be an equality word of two binary non-periodic morphisms  $g, h : \{a, b\}^* \rightarrow \Delta^*$  with unique overflows. It is known that if  $w$  contains at least 25 occurrences of each of the letters  $a$  and  $b$ , then it has to have one of the following special forms: up to the exchange of the letters  $a$  and  $b$  either  $w = (ab)^i a$ , or  $w = a^i b^j$  with  $\gcd(i, j) = 1$ . We will generalize the result, justify this bound and prove that it can be lowered to nine occurrences of each of the letters  $a$  and  $b$ .

**Keywords:** combinatorics on words, binary equality languages

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