

Djursholm, Sweden
MLI

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A Ramsey Question in the Symmetric Group.

Question 12.1. *Given k and r , does there exist n such that whenever the symmetric group S_n is k -coloured there is a monochromatic copy of S_r ?*

To make sense of this, it is necessary to explain what a 'copy of S_r ' means. We view S_n as the set of all words of length n , on symbols $1, \dots, n$, such that no symbol is repeated. Given words x_1, \dots, x_r on symbols $1, \dots, n$, such that the sum of the lengths of the x_i is n and no symbol is repeated, a copy of S_r means the set of all possible $r!$ concatenations (in any order) of x_1, \dots, x_r .

This is easy to check when $r = 2$, but even for $r = 3$ we do not know it. In fact, we do not even know it in the case $r = 3$ and $k = 2$.