



Year: 2006

Vol.: 69

Fasc.: 3

Title: The probability of generating the symmetric group when one of the generators is random

Author(s): László Babai and Thomas P. Hayes

A classical result of JOHN DIXON (1969) asserts that a pair of random permutations of a set of n elements almost surely generates either the symmetric or the alternating group of degree n . We answer the question, “For what permutation groups $G \leq S_n$ do G and a random permutation $\sigma \in S_n$ almost surely generate the symmetric or the alternating group?” Extending Dixon’s result, we prove that this is the case if and only if G fixes $o(n)$ elements of the permutation domain. The question arose in connection with the study of the diameter of Cayley graphs of the symmetric group. Our proof is based on a result by Luczak and Pyber on the structure of random permutations.

Address:

László Babai
Department of Computer Science
University of Chicago
Chicago
USA
E-mail: laci@cs.uchicago.edu

Address:

Thomas P. Hayes
Computer Science Division
University of California Berkeley
Berkeley
USA
E-mail: hayest@cs.berkeley.edu