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Fast multiplication algorithm for Sylow 2-subgroups of symmetric groups

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Let p be a prime number, G be a group of the order $p^n \cdot k$, where p does not divider k, $n, k \in \mathbb{N}$. Remind that a subgroup of order p^k is called a *Sylow p-subgroup of the group G* and is denoted by $Syl_p(G)$ [3]. The Sylow p-subgroups and their properties are well studied (e.g. [2], [1]).

We are present a fast algorithm for multiplying of two permutations of Sylow 2-subgroup of the symmetric group S_{2^n} of the time complexity $O(n2^n)$. For this purpose we use the representation of elements of the group $Syl_2(S_{2^n})$ by binary labeled rooted trees. Also we describe the multiplication algorithm for rooted trees [4]. The time complexity of all proposed algorithms are estimated.

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