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Multiplicities of faithful irreducible character degrees of subgroups of wreath product p -groups. Preliminary report.

Let p be an odd prime, let Z_p denote the cyclic group of order p , and let P denote the iterated regular wreath product group $Z_p \wr Z_p \wr Z_p$, which has an obvious normal subgroup B that is an elementary abelian p -group of rank p^2 . We have developed an algorithm for calculating the number of faithful irreducible ordinary characters of each degree for certain well-behaved subgroups of P . This algorithm is computationally practical when the prime p is small. We have successfully implemented this algorithm in the cases $p = 3$ and $p = 5$ for a particular collection of subgroups of P which we denote by H_{jk} , where the indices j and k are integers ranging over $0 \leq j < p^2 - p$ and $0 \leq k < p$. We mention that H_{jk} splits over its abelian normal subgroup $B \cap H_{jk}$, and that the indices j and k correspond to the facts that $|B : B \cap H_{jk}| = p^j$ and $|H_{jk} : B \cap H_{jk}| = p^{p-1-k}$. In the case $p = 5$ our implementation involved the creation of an extensive and elaborate computer program. In this talk we present the data that we have obtained using our algorithm, namely the number of faithful irreducible characters of every degree for each of the subgroups H_{jk} in the cases $p = 3$ and $p = 5$. (Received August 27, 2012)