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Corrigendum

Corrigendum to "Sets of elements that pairwise generate a linear group" [J. Combin. Theory Ser. A 115 (3) (2008) 442–465]

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Let G be a finite group that can be generated by two elements. We define $\mu(G)$ to be the largest positive integer m such that there exists a subset X in G of order m with the property that any distinct pair of elements of X generates G. Let n be a positive integer, q a prime power, and V the n-dimensional vector space over the field of q elements. Let $[x]$ denote the integer part of the real number x. In [1] the following was proved.

Theorem 1. *Let G be any of the groups $(P)GL(n,q)$, $(P)SL(n,q)$. Let b be the smallest prime factor of n, let $[\frac{n}{k}]_q$ be the number of k-dimensional subspaces of V, and let $N(b)$ be the number of subspaces of V of dimensions not divisible by b. Suppose that $n \geqslant 12$. If $n \not\equiv 2 \pmod 4$, or if $n \equiv 2 \pmod 4$, q odd and $G = (P)SL(n,q)$, then*

$$\mu(G) = \frac{1}{b}\prod_{\substack{i=1\\ b\nmid i}}^{n-1}\left(q^n - q^i\right) + \sum_{\substack{k=1\\ b\nmid k}}^{[n/2]}\begin{bmatrix} n\\ k\end{bmatrix}_q,$$

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otherwise

$$\mu(G) = \frac{1}{b}\prod_{\substack{i=1\\ b\nmid i}}^{n-1}\left(q^n - q^i\right) + \left[N(b)/2\right].$$

For a non-cyclic finite group G let $\sigma(G)$ be the smallest number m such that G is the union of m proper subgroups. The following was also proved in [1].

Theorem 2. *Let G be any of the groups $(P)GL(n,q)$, $(P)SL(n,q)$. Let b be the smallest prime factor of n. Suppose that $n \geqslant 12$. If $n \not\equiv 2 \pmod 4$, or if $n \equiv 2 \pmod 4$, q odd and $G = (P)SL(n,q)$, then $\sigma(G) = \mu(G)$. Otherwise $\sigma(G) \neq \mu(G)$ and*

$$\sigma(G) = \frac{1}{2}\prod_{\substack{i=1\\ 2\nmid i}}^{n-1}\left(q^n - q^i\right) + \sum_{\substack{k=1\\ 2\nmid k}}^{(n/2)-1}\begin{bmatrix} n \\ k \end{bmatrix}_q + \frac{q^{n/2}}{q^{n/2}+1}\begin{bmatrix} n \\ n/2 \end{bmatrix}_q + \epsilon$$

where $\epsilon = 0$ if q is even and $\epsilon = 1$ if q is odd.

We point out that the statements of [1, Theorem 1.1] and [1, Theorem 1.2] were oversimplified since for $n \equiv 2 \pmod 4$, $n \geqslant 12$, q odd, and $G = (P)SL(n,q)$ these statements imply the incorrect formula

$$\mu(G) = \sigma(G) = \frac{1}{b}\prod_{\substack{i=1\\ b\nmid i}}^{n-1}\left(q^n - q^i\right) + \left[N(b)/2\right]$$

instead of

$$\mu(G) = \sigma(G) = \frac{1}{b}\prod_{\substack{i=1\\ b\nmid i}}^{n-1}\left(q^n - q^i\right) + \sum_{\substack{k=1\\ b\nmid k}}^{[n/2]}\begin{bmatrix} n \\ k \end{bmatrix}_q.$$

References

[1] J.R. Britnell, A. Evseev, R.M. Guralnick, P.E. Holmes, A. Maróti, Sets of elements that pairwise generate a linear group, J. Combin. Theory Ser. A 115 (3) (2008) 442–465.