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Maximal sum-free sets in abelian groups of order divisible by three: Corrigendum

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The last step of the proof in [2] was omitted. To complete the argument, we proceed in the following way. We had shown that $H = H(S) = H(S+S) = H(S-S)$, that $|S-S| = 2|S| - |H|$ and hence that in the factor group $G^* = G/H$ of order $3m$, the maximal sum-free set $S^* = S/H$ and its set of differences $S^* - S^*$ are aperiodic, with

(1) $$|S^*-S^*| = 2|S^*| - 1 = 2m - 1 ,$$

so that

(2) $$|S^* \cup (S^*-S^*)| = |G^*| = 1 = 3m - 1 .$$

By (1) and Theorem 2.1 of [1], $S^* - S^*$ is either quasiperiodic or in arithmetic progression.

In the former case, $S^* - S^* = T' \cup T''$ where $T' = T' + K^*$ and $T'' \subseteqq t + K^*$ for some subgroup K^* of G^* and for some $t \in T''$. But $S^* - S^* = -(S^*-S^*)$, so $T'' \subseteqq K^*$. If $S^* \cap K^* \neq \emptyset$, then the sum-freeness of S^* implies that no complete coset of K^* is contained in S^*. This fact, together with (2), contradicts the quasiperiodicity of $S^* - S^*$. So $S^* \cap K^* = \emptyset$, but this forces S^* to be periodic with period K^* and again we have a contradiction.

Hence $S^* - S^*$ is in arithmetic progression with difference d and, by (1), the order of d is $3m$. But now by Lemma 4.3 of [1], S^* is also in arithmetic progression with difference d, so that $|S^*+S^*| = 2|S^*| - 1$ which proves Yap's conjecture. Also G^* is the

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cyclic group Z_{3m} and the automorphism of G^* which maps d to 1 maps S^* to the set $\{m, m+1, \ldots, 2m-1\}$.

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