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Correction to: On subset sums of $\mathbb{Z}_n^\times$ which are equally distributed modulo n

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Correction to: Arch. Math.
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It has been brought to the author's attention that the statement of [1, Theorem 2.4] is incorrect. However, it is easily corrected by adding the following relation to its statement: The number r is the minimum number such that

$$2^r \equiv 1 \pmod q \quad \text{or} \quad 2^r \equiv -1 \pmod q.$$

The reason is the following:

In the proof, we deduce that there is a permutation s of $\{1, 2, \ldots, k\}$ such that $\langle 2a_i \rangle = \langle a_{s(i)} \rangle$. We need to show that $\langle 2a_r \rangle = \langle a_1 \rangle$ in order to define $B_1 = \{a_1, \ldots, a_r\} = \{b_1 \cdot (\pm 2^{j-1})\}$ with leader $b_1 = a_1$.

But $\langle 2a_r \rangle = \langle a_1 \rangle$ holds if and only if $a_1 \equiv \pm 2a_r$, which is equivalent to $a_1 \equiv \pm 2^r a_1 \pmod q$. Since $\gcd(a_1, q) = 1$, this is possible if $2^r \equiv \pm 1 \pmod q$. The careful reader may observe that $2^r \equiv -1 \pmod q$ is possible only if the order of 2 modulo q is even. This means that if the order of 2 modulo q is odd, the statement is valid without any corrections.

In addition, at the beginning of page 6, the phrase
"From this construction, it is also evident that $a_1 \equiv \pm 2a_r$ since $2^r \equiv 1 \pmod q$" should be

"From this construction, it is also evident that $a_1 \equiv \pm 2a_r$ since $2^r \equiv \pm 1 \pmod q$".

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References

[1] Konstantinos, G.: On subset sums of $\mathbb{Z}_n^\times$ which are equally distributed modulo n. Arch. Math. (Basel) **121**(1), 47–54 (2023)

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