On the number of fully weighted zero-sum subsequences.

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Abstract. Let G be a finite additive abelian group with exponent n and $S = g_1 \cdots g_t$ be a sequence of elements in G. For any element g of G and $A \subseteq \{1, 2, \ldots, n-1\}$, let $N_{A,g}(S)$ denote the number of subsequences $T = \prod_{i \in I} g_i$ of S such that $\sum_{i \in I} a_i g_i = g$, where $I \subseteq \{1, \ldots, t\}$ and $a_i \in A$. We prove that $N_{A,0}(S) \geq 2^{|S|-D_A(G)+1}$, when $A = \{1, \ldots, n-1\}$, where $D_A(G)$ is the smallest positive integer l, such that every sequence S over G of length at least l has nonempty subsequence $T = \prod_{i \in I} g_i$ such that $\sum_{i \in I} a_i g_i = 0$, $I \subseteq \{1, \ldots, t\}$ and $a_i \in A$. Moreover, we classify the sequences such that $N_{A,0}(S) = 2^{|S|-D_A(G)+1}$, where the exponent of G is an odd number.