

Abstract: The main topic of this talk is a generalization of the classical concept of difference sets: Given a non-empty set of positive integers $S \subseteq N$, consider the multiset $D(S) = \{s-t \mid s, t \in S, s > t\}$ of all positive differences of elements from S together with its frequency sequence $\Lambda(S) = \{\lambda_i \mid i \in N\}$, where λ_i represents the number of times the positive natural number i appears as a difference in $D(S)$.

While every non-empty subset of N has a corresponding frequency sequence, it is not hard to discover that while one frequency sequence may correspond to infinitely many subsets S of N , there also exist numerous examples of infinite sequences Λ that do not correspond to any set S at all.

In our talk, we address two basic problems concerning the frequency sequences of generalized difference sets: the problem of the *classification of sequences Λ that allow for the existence of S* satisfying $\Lambda(S) = \Lambda$, and the problem of the *minimal density* of such a set S .

We intend the talk to be highly non-technical, and to emphasize the fun side of the good old natural numbers.