Exposé court

93 *A Generalization of H-fold sumset of set of integers*

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Let A be a nonempty finite set of integers and h be a positive integer. The *h-fold sumset*, denoted by hA, is the set of integers that can be written as the sum of h elements of A and the *restricted h-fold sumset*, denoted by $h^\wedge A$, is the set of integers that can be written as the sum of h pairwise distinct elements of A. Several generalizations of these sumsets have been introduced in the literature. For a finite set H of positive integers, Bajnok introduced the *sumset HA* and the *resticted sumset $H^\wedge A$*, where HA is the union of the sumsets hA for $h \in H$ and the restricted sumset $H^\wedge A$ is the union of the sumsets $h^\wedge A$ for $h \in H$. Recently, Bhanja and Pandey considered a generalization of HA and $H^\wedge A$, the *generalized H-fold sumset*, denoted by $H^{(r)}A$, defined by

$$H^{(r)}A := \bigcup_{h \in H} h^{(r)}A,$$

where $h^{(r)}A$ is the set of integers that can be written as sum of h elements of A in which each summand is repeated at most r times. Therefore, HA and $H^\wedge A$ are particular cases of $H^{(r)}A$ for $r = h$ and $r = 1$, respectively. In this talk, we present the optimal lower bound for the cardinality of $H^{(r)}A$, i.e., for $|H^{(r)}A|$ (called *Direct Problem*) and the structure of the underlying sets A and H when $|H^{(r)}A|$ is equal to the optimal lower bound in the cases A contains only positive integers and A contains only nonnegative integers (called *Inverse Problem*). Furthermore, the sumset $H^{(r)}A$ becomes more important as it also generalizes *subset sums* and *subsequence sums*, so we get several results of subsequence sums and subset sums as special cases on choosing particular sets H.
(This is a joint work with Mohan.)