1003-11-779 **Donald Mills*** (`dmills@math.siu.edu`), Department of Mathematics, SIUC, Carbondale, IL 62901-4408. *Subset sum representations of sequences of positive integers.* Preliminary report.

D. P. Moulton and M. Develin have investigated the notion of representing various sets of positive integers, specifically powers of integers and factorials, as subset sums of smaller sets. For example, the set $S = \{1, 2, 4, 8, 16\}$ can be represented by the set $R = \{-5, 1, 7, 9\}$, as $1 \in R$, $2 = -5 + 7$, $4 = -5 + 9$, $8 = 1 + 7$, and $16 = 7 + 9$. Thus, S, a set of cardinality 5, is represented by a set of cardinality 4. In general, we say that the *rank* of an integer set S of size m is the smallest number $p(m)$ such that S can be represented by an integer set R of cardinality $p(m)$. We are particularly concerned with the *limiting rank* of a positive integer sequence $\mathbf{a} = \{a_j\}$, namely with $\rho(\mathbf{a}) = \lim\limits_{m \to \infty} \dfrac{p(m)}{m}$. The value of ρ seems difficult to determine; upper bounds have been determined for geometric sequences, while Develin showed that the factorial sequence has limiting rank at least 1/2. We show, via a result of Sprague, that any polynomially-bounded sequence has zero limiting rank, and ask what may be said about a given sequence of positive integers, provided its limiting rank is zero. Other questions will also be considered in the course of the talk. (Received September 29, 2004)

1