Zoltán Füredi, Robert H. Sloan and Ken Takata*, Dept. of Math. and C.S., Adelphi University, P.O. Box 701, Garden City, NY 11530-0701, and György Turán. Set systems with the minimal number of sets and the (4,3)-threshold property.

For $n$, $k$, and $t$ such that $1 < t < k < n$, a set $\mathcal{F}$ of subsets of $[n]$ has the $(k,t)$-threshold property if every $k$-subset of $[n]$ contains at least $t$ sets from $\mathcal{F}$ and if every $(k-1)$-subset of $[n]$ contains fewer than $t$ sets. The minimal number of sets in a set system with this property is denoted by $m(n, k, t)$, and such a set system is called an optimal system. $m(n, 4, 3)$ can be determined exactly for $n$ sufficiently large. We will first give an example of an optimal system (called a packing construction) that uses only 2-sets and 3-sets. Then we will show how all other optimal systems with the (4,3)-threshold property can be derived from packing constructions and how the number of packing constructions gives an upper bound on the total number of optimal systems. (Received September 27, 2005)