1030-05-338 **Sebastian M. Cioabă*** (scioaba@math.ucsd.edu), University of California, San Diego, Department of Mathematics, La Jolla, CA 92093-0112, and **André Kündgen** (akundgen@csusm.edu), California State University, San Marcos, CA 92096-0001. *Covering hypergraphs with cuts of minimum total size.*

Given a partition $X_1, X_2, \ldots X_k$ of the vertex-set V of a hypergraph H, the *k-cut* $[X_1, X_2, \ldots, X_k]$ is the set of all edges of H that intersect each X_i for $1 \leq i \leq k$. In this paper we study the problem of covering r-uniform hypergraphs by k-cuts so as to minimize the total sum of the sizes of the cuts, and thus the average number of times an edge is cut.

Let $s_{k,r}(n)$ denote the minimum total size of a k-cut cover of the edges of the complete r-uniform hypergraph on n vertices. For all $2 \leq k \leq r$, we show that $s_{k,r}(n) = (s_{k,r} - o(1))\binom{n}{r}$ for some constant $s_{k,r}$ as $n \to \infty$. When $k = r$, we prove that $s_{r,r}(n) = \binom{n}{r}$ when r is odd, but $\frac{r+2}{r+1} \leq s_{r,r} \leq 2$ when r is even.

A 2-cut $[X, V \setminus X]$ is called *stable* if X contains no edges. For a given $r \geq 3$, we show that there is a number n_r such that for every $n > n_r$, $s_{2,r}(n)$ is uniquely achieved by a cover with $\lfloor \frac{n-1}{r-1} \rfloor$ stable cuts (and thus $s_{2,r} = r$), and that $c_1 r 2^r < n_r < c_2 r^4 2^r$. Using known results for $s_{2,2}(n)$ we also determine $s_{2,3}(n)$ exactly for all n. (Received August 06, 2007)