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**Amin Bahmanian\*** (mzb0004@auburn.edu), 221 Parker Hall Dept. of Math. and Stat., Auburn University, Auburn, AL 36849. *Connected Baranyai's Theorem.*

Let  $K_n^h = (V, \binom{V}{h})$  be the complete  $h$ -uniform hypergraph on vertex set  $V$  with  $|V| = n$ . Baranyai showed that  $K_n^h$  can be expressed as the union of edge-disjoint  $r$ -regular factors if and only if  $h$  divides  $rn$  and  $r$  divides  $\binom{n-1}{h-1}$ . We prove that  $\lambda K_n^h$  can be expressed as the union  $\mathcal{G}_1 \cup \dots \cup \mathcal{G}_k$  of  $k$  edge-disjoint factors, where for  $1 \leq i \leq k$ ,  $\mathcal{G}_i$  is  $r_i$ -regular if and only if (i)  $h$  divides  $r_i n$  for  $1 \leq i \leq k$ , (ii)  $\sum_{i=1}^k r_i = \lambda \binom{n-1}{h-1}$ . Moreover, for  $1 \leq i \leq k$ , if  $r_i \geq 2$ , we can guarantee that  $\mathcal{G}_i$  is connected, generalizing Baranyai's theorem, and answering a questions by Katona. (Received January 17, 2012)