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**Zbl 491.05049****Chung, F.R.K.; Erdős, Paul; Graham, Ronald L.***Minimal decompositions of graphs into mutually isomorphic subgraphs.* (In English)**Combinatorica 1, 13-24 (1981). [0209-9683]**

Let  $G = \{G_1, \dots, G_k\}$  be a collection of  $n$ -vertex graphs each with the same (unspecified) number of edges. Let  $U(G)$  be the least  $r$  for which there exists a set of partitions of the edge sets  $E(G_i)$  of the graph into  $r$  parts, say  $E(G_i) = \cup_{j=1}^r E_{ij}$ , such that for each  $j$ , all the  $E_{ij}$  are isomorphic as graphs,  $1 \leq i \leq k$ . Let  $U_k(n)$  denote the largest value  $U(G)$  can take with  $G$  as above. The authors and other earlier showed [Congr. Numerantium 23, 3-18 (1979; Zbl 434.05046)] that  $U_2(n) = 2n/3 + o(n)$  as  $n \rightarrow \infty$ . Here they show  $U_k(n) = 3n/4 + o(n)$  for any fixed  $k \geq 3$ , as  $n \rightarrow \infty$ . The difficult part of the proof is the establishment of the upper bound. Broadly speaking, it is done by successively removing subgraphs which are shown to be common to all the  $G_i$ , where the subgraph removed at any state depends on the number of edges in the  $G_i$ .

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Classification:

05C70 Factorization, etc.

05C35 Extremal problems (graph theory)

Keywords:

factorization; partition of edge set