Multidecompositions of Complete Graphs into a Graph Pair of Order 6

Yizhe Gao, Dan Roberts*

Department of Mathematics, Illinois Wesleyan University, Bloomington, IL 61701
drobert1@iwu.edu

A pair of graphs \{G, H\} is a graph pair of order \(m\) if (i) \(G\) and \(H\) each have order \(m\) and no isolated vertices, (ii) \(G\) and \(H\) are not isomorphic, and (iii) \(E(G) \cup E(H) = K_m\). A \((G, H)\)-multidecomposition of order \(n\) is a partition of the edges of \(K_n\) into copies of \(G\) and \(H\) with at least one copy of \(G\) and at least one copy of \(H\). We provide necessary and sufficient conditions on \(n\) for the existence of a \((G, H)\)-multidecomposition of order \(n\) in the case where \(G\) is a 6-cycle and \(H\) is the complement of a 6-cycle.