Decomposing Complete Graphs into Sun Graphs of 3-cycle

Chin-Mei Fu
Tamkang University
cmfu@math.tku.edu.tw

(joint work with Nan-Hua Jhuang, Wei-Hung Lee, and Yuan-Lung Lin)

Let G be a graph with at least three vertices and suppose $V(G) = \{v_1, v_2, \ldots, v_n\}$. Add n new vertices $\{w_1, w_2, \ldots, w_n\}$ to G together with edges $\{v_i, w_i\}$, for $1 \leq i \leq n$. The resulting graph on $2n$ vertices is called a sun graph of G, denoted by $S(G)$. A sun graph of 3-cycle, $S(C_3)$, is a graph with six vertices $v_1, v_2, \ldots, v_6$ and edges $\{v_1, v_2\}, \{v_2, v_3\}, \{v_3, v_1\}, \{v_1, v_4\}, \{v_2, v_5\}, \{v_3, v_6\}$. The decomposition of a graph G into graphs $H_1, H_2, \ldots, H_m$ if $H_1, H_2, \ldots, H_m$ are edge-disjoint subgraphs of G and the union of edge sets of these subgraphs is the edge set of G.

In this paper, we obtain the necessary and sufficient condition for the decomposition of K_n into sun graphs of 3-cycle. At the same time we have decomposed $K_{p,p,r}$ into sun graphs of 3-cycle.

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