2-steps Hamiltonian graphs Of Line Graphs Of Open Trees of Cycles

G.C. Lau, Sin-Min Lee, Karl Schaffer and Alex Jialong Sun*, Sacramento Waldorf School.

Let G be a graph with vertex set $V(G)$ and edge set $E(G)$. A (p, q)-graph $G = (V, E)$ is said to be AL(k)-traversal if there exist a sequence of vertices $(v_1, v_2, \ldots, v_p)$ such for each $i = 1, 2, \ldots, p-1$, the distance for v_i and v_{i+1} is equal to k. We call a graph G a 2-steps Hamiltonian graph if it has a AL(2)-traversal in G and $d(v_p, v_1) = 2$. Let Gph(∗) be the class of graphs $(H, \{h\})$ where x is a distinguished vertex. Let T be a tree with $X = \{x_1, x_2, \ldots, x_n\}$ be the leaves of T. We define the following construction: For any $f : X \to \text{Gph}(*)$, if $f(x_i) = (H_i, \{h_i\})$, we form the disjoint union of T and $(H_i, \{h_i\})$ and identify x_i with h_i. The resulting graph is called the open tree of f, and denote by $O(T, f)$. In this paper we investigate a construction of 2-steps Hamiltonian graphs with open trees of cycles and their line graphs.

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