

On Gracefulness of Vertice Splitting Extensions of Cycles

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Given a graph $G = (V, E)$ and $S \subset V(G)$, and a mapping $f : S \rightarrow \mathbb{N}$. For u in S and $f(u) = k$, we associate a set $Su = \{u_1, u_2, \dots, u_k\}$. The vertice splitting extension $VSplit(G, S, f)$ is the graph with

$$V(VSplit(G, S, f)) = V(G) \cup \{Su \mid u \in S\}$$

and

$$E(VSplit(G, S, f)) = E(G) \cup \{(u_i, v_j) \mid \text{if } u_i \in Su, v_j \in Sv \text{ and } (u, v) \in E(G)\}.$$

We use this construction create infinite families of new graceful graphs from cycles.

Keywords: Graceful labeling , k -graceful graphs, vertice splitting extension, cycle