Abstract

The line graph, 1-quasitotal graph and 2-quasitotal graph are well-known. It is proved that if $G$ is a graph consist of exactly $m$ connected components $G_i$, $1 \leq i \leq m$, then $L(G) = L(G_1) \bigoplus L(G_2) \bigoplus \ldots \bigoplus L(G_m)$ where $L(G)$ denotes the line graph of $G$, and $\bigoplus$ denotes the ring sum operation on graphs. The number of connected components in $G$ is equal to the number of connected components in $L(G)$ and also if $G$ is a cycle of length $n$, then $L(G)$ is also a cycle of length $n$. The concept of 1-quasitotal graph is introduced and obtained that $Q_1(G) = G \bigoplus L(G)$ where $Q_1(G)$ denotes 1-quasitotal graph of a given graph $G$. It is also proved that for a 2-quasitotal graph of $G$, the two conditions (i) $|E(G)| = 1$; and (ii) $Q_2(G)$ contains unique triangle are equivalent.

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**Index Terms**

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- Line graph
- Quasi total graph
- Connected component.