Cycle domination, independence, and irredundance in Graphs

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A set $S$ of vertices in a graph $G = (V, E)$ is called cycle independent if the induced subgraph $G[S]$ is acyclic. A set $S$ is cycle dominating if for every vertex $u \in V \setminus S$ there exists a vertex $v \in S$ such that $u$ and $v$ are contained in a cycle in $G[S \cup \{u\}]$. A set $S$ is cycle irredundent if for every vertex $v \in S$ there exists a vertex $u \in V \setminus S$ such that $u$ and $v$ are in a cycle of $G[S \cup \{u\}]$, but $u$ is not in a cycle of $G[S \cup \{u\} \setminus \{v\}]$. In this talk we present, and investigate, these new concepts, which generalizes in a natural way the concepts of independence, domination and irredundance in graphs.

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