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Complete forcing numbers of catacondensed hexagonal systems.

Summary: Let $G$ be a graph with edge set $E(G)$ that admits a perfect matching $M$. A forcing set of $M$ is a subset of $M$ contained in no other perfect matchings of $G$. A global forcing set of $G$, introduced by Vukičević et al., is a subset of $E(G)$ on which there are distinct restrictions of any two different perfect matchings of $G$. Combining the above “forcing” and “global” ideas, we introduce and define a complete forcing set of $G$ as a subset of $E(G)$ on which the restriction of any perfect matching $M$ of $G$ is a forcing set of $M$. The minimum cardinality of complete forcing sets is the complete forcing number of $G$. First, we establish some initial results about these two novel concepts, including a criterion for a complete forcing set, and comparisons between the complete forcing number and global forcing number. Then, we give an explicit formula for the complete forcing number of a hexagonal chain. Finally, a recurrence relation for the complete forcing number of a catacondensed hexagonal system is derived.

Keywords: perfect matching; Kekulé structure; forcing number; forcing set; global forcing number; complete forcing number; catacondensed hexagonal system
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