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Abstract

A graph G of order n is called arbitrarily partitionable (AP, for short) if, for every sequence $\tau = (n_1, \ldots, n_k)$ of positive integers that sum up to n, there exists a partition $(V_1, \ldots, V_k)$ of the vertex set $V(G)$ such that each set V_i induces a connected subgraph of order n_i. A graph G is called AP+1 if, given a vertex $u \in V(G)$ and an index $q \in \{1, \ldots, k\}$, such a partition exists with $u \in V_q$. We consider the Cartesian product of AP graphs. We prove that if G is AP+1 and H is traceable, then the Cartesian product $G \Box H$ is AP+1. We also prove that $G \Box H$ is AP, whenever G and H are AP and the order of one of them is not greater than four.

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