

The Chvátal-Erdős condition for prism-hamiltonicity

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A graph G is *prism-hamiltonian* if the prism $G \square K_2$ is hamiltonian. In general, being prism-hamiltonian is weaker than having a hamilton path, but stronger than having a spanning closed 2-walk (a walk using every vertex at most twice). Chvátal and Erdős showed that a graph G has a hamilton cycle if $\alpha(G) \leq \kappa(G)$, where $\alpha(G)$ is the independence number and $\kappa(G)$ is the connectivity. As corollaries of this, G has a hamilton path if $\alpha(G) \leq \kappa(G) + 1$, and a spanning closed 2-walk if $\alpha(G) \leq 2\kappa(G)$; these results are best possible. We show that the same condition that guarantees a spanning closed 2-walk, $\alpha(G) \leq 2\kappa(G)$, also guarantees the stronger conclusion of prism-hamiltonicity, answering a question of West.

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