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THE HEDETNIEMI CONJECTURE IN HEREDITARNIA

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A *graph property* is a set of countable graphs. A *homomorphism* from a graph G to a graph H is an edge-preserving map from the vertex set of G into the vertex set of H. If such a map exists, we write $G \to H$. Given any graph H, the *hom-property* $\to H$ is the set of H*-colourable graphs*, i.e., the set of all (countable) graphs G satisfying $G \to H$. A graph property $\mathcal{P}$ is *of finite character* if, whenever we have that $H \in \mathcal{P}$ for every finite induced subgraph H of a graph G, then we have that $G \in \mathcal{P}$ too.

The well-known conjecture of Hedetniemi states that, for all (finite) graphs G and H, we have that $\chi(G \times H) = min\{\chi(G), \chi(H)\}$.

We study the (distributive) lattice of hom-properties of finite character and discuss a number of equivalent formulations of this conjecture of Hedetniemi which can be made in terms of (amongst others) the meet-irreducibility of the hom-property $\to K_n$ of n-colourable graphs in this lattice.