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The Restricted Homomorphism Problem

The *restricted homomorphism problem* $\mathrm{RHP}(H,Y)$ asks: given an input digraph G and a homomorphism $g\colon G \to Y$, does there exist a homomorphism $f\colon G \to H$? We prove if H is *hereditarily hard* and $Y \not\to H$, then $\mathrm{RHP}(H,Y)$ is NP-complete.

Since non-bipartite graphs are hereditarily hard, this settles in the affirmative a conjecture of Hell and Nešetřil.

This is joint work with Timothy Graves.