Fully Invariant and Verbal Congruences

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A congruence, θ, on an algebra $\mathbf{A}$, is called *fully invariant* if, for every endomorphism f, $(x, y) \in \theta \implies \big(f(x),\, f(y)\big) \in \theta$. The congruence θ is called *verbal* if, for some variety $\mathcal{V}$, θ is the smallest congruence on $\mathbf{A}$ yielding a quotient that lies in $\mathcal{V}$.

It has long been known that every verbal congruence is fully invariant. The converse is false, but counterexamples are not so easy to come by. In this talk we will discuss the relationship of these two concepts and present conditions on a congruence, an algebra, and a variety under which the converse holds. In particular we show this is true for the variety generated by a subalgebra-primal algebra. The proof is a nice application of "NU-Duality".

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