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Matt Insall* (insall@umr.edu), Department of Mathematics and Statistics, University of Missouri - Rolla, Rolla, MO 65409-0020. *Equational Logic for Finitary Multi-Algebras*. Preliminary report.

A **(finitary) Multi-Algebra** is a tuple

$$\mathbb{A} = (A; (f_i^{\mathbb{A}})_{i \in I}),$$

where A is a nonempty set and for each $i \in I$, there are pairs of (finite) ordinals $(m_i^{(1)}, n_i^{(1)})$ and $(m_i^{(2)}, n_i^{(2)})$ such that

$$f_i^{\mathbb{A}} : A^{m_i^{(1)} \times n_i^{(1)}} \rightarrow A^{m_i^{(2)} \times n_i^{(2)}}.$$

(That is, $f_i^{\mathbb{A}}$ maps $m_i^{(1)} \times n_i^{(1)}$ matrices over A to $m_i^{(2)} \times n_i^{(2)}$ matrices over A .) We will develop Equational Logic for multi-algebras and describe equational classes of multi-algebras, in the spirit of the classic theorem of Birkhoff. (Received September 27, 2005)