1090-03-132 **Roger D Maddux*** (maddux@iastate.edu), Math. Dept. 396 Carver Hall, Iowa State University, Ames, IA 50011. *Consistent theories with no finite models.* Preliminary report.

Every finite relation algebra has a corresponding finitely axiomatized first-order theory in a language containing only binary relation symbols and equality. The theory has a model if and only if the algebra is representable.

Some consistent theories arising in this way have no infinite models, and some have no finite models. For example, J. D. Monk's relation algebras give rise to theories that have no infinite models because of Ramsey's Theorem for binary relations. The theory of dense linear orderings without endpoints, which comes from a relation algebra having 8 elements, has no finite models because there is no transitive dense antisymmetric relation on a finite set.

Other examples of consistent theories without finite models, ones that (perhaps surprisingly) involve only symmetric relations, come from a class of relation algebras suggested by A. Tarski in 1973. A similar example was found recently. Proofs that these theories have no finite models are combinatorial and deal with edge-colorings of complete graphs. They will be presented in pictures, along with several open problems whose solutions are needed in order to complete a survey (started by R. Lyndon in 1950) of the 102 integral relation algebras with 16 elements. (Received February 25, 2013)