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AF Inverse Monoids and the Coordinatization of MV-algebras

MV-algebras are the algebras associated to many-valued logics, analogous to the way that Boolean algebras are associated to classical propositional logics. In the mid-1980's, D. Mundici established an equivalence between the category of MV-algebras and the category of ℓ -groups (with archimedean order unit). This restricts to a correspondence between countable MV-algebras and AF C^* -algebras with lattice-ordered K_0 group. We introduce a class of AF inverse Boolean monoids and prove a coordinatization theorem (in the spirit of von Neumann's Continuous Geometry). This theorem states that every countable MV-algebra can be coordinatized (i.e. is isomorphic to the lattice of principal ideals of some AF Boolean inverse monoid). Techniques involve use of Bratteli diagrams and colimits of semisimple inverse monoids. We shall illustrate this in the case of certain specific AF C^* -algebras (e.g. the CAR algebra of a Fermi gas). If time permits, we will mention related work, e.g. relations with Effect Algebras (B. Jacobs) and a general coordinatization theorem in recent work of F. Wehrung. [Joint work with Mark Lawson (Heriot-Watt)]