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On Finitely Valued Bimodal Symmetric Gödel Logics

A "symmetric" formulation of intuitionistic propositional calculus Int^2, suggested by various authors (G. Moisil, A. Kuznetsov, C. Rauszer), presupposes that each of the connectives $\&, \vee, \rightharpoonup, \top, \bot$ has its dual $\vee, \&, \rightharpoondown, \bot, \top$, and the duality principle of the classical logic is restored. Gödel logic is the extension of intuitionistic logic by linearity axiom: $(p \to q) \vee (q \to p)$. Denote by G_n the n valued Gödel logic.

We investigate symmetric Gödel logic G_n^2, the language of which is enriched by two modalities $\Box_1$,$\Box_2$. The resulting system is named bimodal symmetric Gödel logic and is denoted by MG_n^2. MG_n^2-algebras represent algebraic models of the logic MG_n^2. The variety $\mathbf{MG_n^2}$ of all MG_n^2-algebras is generated by finite linearly ordered MG^2-algebras of finite height m, where $1 \leq m \leq n$. We focus on MG_n^2 algebras, which correspond to n valued MG_n^2 logic.

A description and characterization of m-generated free and projective MG^2-algebras in the variety $\mathbf{MG_n^2}$ is given.