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8. Analysis

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Orthomodular posets of projections on linear spaces and signed measures on them

Properties of the orthomodular posets of all (continuous) linear projections on some topological linear spaces and linear spaces over some fields are considered. In particular, the Hilbert space and the space of all random variables on an atomless probability space are considered. The well-known Gleason representation of all states defined on the orthomodular poset of all orthogonal projections on a real Hilbert space is not true in the finite-dimensional case for signed-measures because a signed-measure may be spoilt by superposition with an additive not linear functional on $\mathbf{R}$. We proved an analogue of the Gleason theorem for signed-measures defined on the set of all linear projections defined on the infinite dimensional Hilbert space and on a linear space over rationals (when the counterexample mentioned above is missing) or over residue fields or some extensions of them. Some proofs use computer calculations.