ON THE HERMITIAN PART OF RICKART *-RINGS

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An associative involution ring R is said to be Rickart if the right annihilator of every element of R is generated by a projection (necessarily, uniqe). The most important example of such a ring is the ring $\mathcal{B}(H)$ of bounded linear operators of a Hilbert space H. The Hermitian part S of R consists, by definition, of the self-adjoint elements of R. If S, like the subset $\mathcal{S}(H)$ of self-adjoint Hilbert space operators, does not contain nilpotent elements distinct from 0, then the relation $\preceq$ on S defined by

$$x \preceq y \text{ if and only if } x(y - x) = 0$$

is an order relation (introduced, under the same restriction, for commutative and associative rings by A. Abian in 70-ies and later extended to wide classes of arbitrary rings). On $\mathcal{S}(H)$, this order has been studied, exploring also some theory of Hilbert spaces, in [1, 2, 3].

In the talk, we give an abstract (axiomatic) description of the partial rings arising as a Hermitian part of a Rickart *-ring, and describe their Abian order structure.

References

[1] S. Gudder, *An order for quantum observables*, Math. Slovaca **56** (2006), pp. 573–589.

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