Janda, Jiří; Paseka, Jan

A Hilbert space operator representation of abelian po-groups of bilinear forms. (English)
Zbl 1329.81097
Int. J. Theor. Phys. 54, No. 12, 4349-4355 (2015).

Summary: The existence of a non-trivial singular positive bilinear form [*B. Simon*, J. Funct. Anal. 28, 377–385 (1978; Zbl 0413.47029)] yields that on an infinite-dimensional complex Hilbert space $\mathcal{H}$ the set of bilinear forms $\mathcal{F}(\mathcal{H})$ is richer than the set of linear operators $\mathcal{V}(\mathcal{H})$. We show that there exists an structure preserving embedding of partially ordered groups from the abelian po-group $\mathcal{S}_D(\mathcal{H})$ of symmetric bilinear forms with a fixed domain D on a Hilbert space $\mathcal{H}$ into the po-group of linear symmetric operators on a dense linear subspace of an infinite dimensional complex Hilbert space $l_2(M)$. Moreover, if we restrict ourselves to the positive parts of the above mentioned po-groups, we can embed positive bilinear forms into corresponding positive linear operators.

MSC:

81P10 Logical foundations of quantum mechanics; quantum logic (quantum-theoretic aspects)

Keywords:

effect algebra; generalized effect algebra; Hilbert space; operator; unbounded operator; bilinear form; singular bilinear form

Full Text: DOI

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