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Functional Analysis and Applications Group

Operator spaces and Jordan structures

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Abstract

The space $B(H, K)$ of bounded linear operators from a complex Hilbert space H to a complex Hilbert space K is a vector space usually seen as having no product, unless $H = K$. However, $B(H, K)$ and many other spaces of operators have a lesser-known Jordan algebraic structure which renders multiplication possible and makes those operator spaces a part of a class of complex Banach spaces called JB*-triples. Other examples of JB*-triples are Hilbert spaces, Cartan factors, and C*-algebras.
In the first part of the talk we shall give a brief and self-contained introduction to JB*-triples. The second part will be concerned with the so-called box operators on a JB*-triple V. These bounded linear operators, are defined for each pair $a, b \in V$ and are denoted by $a\Box b\colon V \to V$. The operators $a\Box b$, of which we shall give a brief account, are fundamental in the theory of JB*-triples. We shall also discuss more recent developments. Namely, under which circumstances the box operators can constitute hermitian projections on operator spaces and how they are instrumental in obtaining matrix representations of the Tits–Kantor–Koecher Lie algebras associated with JB*triples.

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