

Commutation of Projections and Characterization of Traces on von Neumann Algebras. III

Bikchentaev A.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015, Springer Science+Business Media New York. We obtain new necessary and sufficient commutation conditions for nonnegative operators and projections in terms of operator inequalities. It is shown that in the general case in this inequalities the projections cannot be replaced by arbitrary nonnegative operators with preservation of operators commutativity. We also present new necessary and sufficient commutation conditions for projections in terms of operator inequalities. These inequalities are applied for trace characterization on von Neumann algebras in the class of all positive normal functionals. We also consider the following problems: I. Characterization of traces among arbitrary weights on von Neumann algebras. II. Characterization of tracial functionals among all positive linear functionals on C*-algebras. III. Characterization of commutativity for C*-algebras.

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Keywords

C*-algebra, Commutativity of operators, Hilbert space, Linear bounded operator, Normal functional, Operator inequality, Projection, Spectral theorem, Trace, Von Neumann algebra, Weight