MR1416312 (97k:47043) 47D25 (46L05 47A30 47B47)
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On the norm of Jordan elementary operators in standard operator algebras. (English summary)

Let \( \mathcal{A} \) be an associative algebra. Then given \( a, b \in \mathcal{A} \), a basic elementary operator \( M_{a,b}: \mathcal{A} \rightarrow \mathcal{A} \) can be defined by \( M_{a,b}(x) = axb \). An elementary operator is a finite sum \( E = \sum_{i=1}^{n} M_{a_i,b_i} \) of basic ones.

It was proved by Mathieu that in the case of prime C\(^*\)-algebras the norm of a basic elementary operator can not only be estimated but in fact computed precisely. Mathieu also considered the operators \( U_{a,b} = M_{a,b} + M_{b,a} \) and proved that \( \|U_{a,b}\| \geq \frac{2}{3}\|a\| \cdot \|b\| \), where \( U_{a,b} \) act on a prime C\(^*\)-algebra \( \mathcal{A} \) [see M. Mathieu, Bull. Austral. Math. Soc. 42 (1990), no. 1, 115–120; MR1066365 (91k:46079)]. In the present paper, for the case of a standard operator algebra \( \mathcal{A} \) acting on a Hilbert space \( \mathcal{H} \), the authors obtain the estimate \( \|U_{a,b}\| \geq 2(\sqrt{2} - 1)\|a\| \cdot \|b\| \).

A standard operator algebra is a subalgebra of \( \mathcal{B}(\mathcal{H}) \) containing all finite-rank operators, where \( \mathcal{B}(\mathcal{H}) \) consist of all bounded linear operators.

Reviewed by Chun Lan Jiang

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