Wong, Ngai-Ching
Triple homomorphisms of C^*-algebras. (English) Zbl 1108.46041
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A celebrated result of *R. Kadison* [Ann. Math. (2) 54, 325–338 (1951; Zbl 0045.06201)] establishes that for every surjective linear isometry T between two C*-algebras A and B, there exists a unitary element u in the unitization of B and a Jordan *-isomorphism $J : A \to B$ satisfying that $T(a) = uJ(a)$ for each $a \in A$.

A linear operator T between two C*-algebras is said to be a triple isomorphism if it preserves triple products of the form $\{x, y, z\} := 2^{-1}(xy^*z + zy^*x)$.

Kadison's theorem was generalized by *W. Kaup* in [Math. Z. 183, 503–529 (1983; Zbl 0519.32024)] by showing that a surjective linear operator between two C*-algebras A and B is a triple isomorphism if and only if it is an isometry. Alternative proofs of Kaup's result have been found in the last years (see, for example, [*T. Dang, Y. Friedman* and *B. Russo*, Rocky Mt. J. Math. 20, No. 2, 409–428 (1990; Zbl 0738.47029); *F. J. Fernández–Polo, J. M. Moreno* and *A. M. Peralta*, J. Math. Anal. Appl. 295, No. 2, 435–443 (2004; Zbl 1058.46033)]).

A linear operator T between two C*-algebras A and B is said to be disjointness preserving if

$$a^*b = ab^* = 0 \text{ implies } (T(a))^*T(b) = T(a)(T(b))^* = 0\ \forall a, b \in A.$$

In his main result, the present author shows that a bounded linear operator T between two C*-algebras is a triple isomorphism if and only if T is disjointness preserving and $T^{**}(1)$ is a partial isometry in B^{**}.

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MSC:

46L05 General theory of C^*-algebras
46B04 Isometric theory of Banach spaces
47B48 Linear operators on Banach algebras
17C65 Jordan structures on Banach spaces and algebras

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