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2–LOCAL LIE ISOMORPHISMS OF NEST ALGEBRAS

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Abstract. Let $\mathcal{N}$ and $\mathcal{M}$ be nests on a separable complex Hilbert space $\mathcal{H}$ of dimension greater than 2, and $\mathrm{Alg}\mathcal{N}$ and $\mathrm{Alg}\mathcal{M}$ be the associated nest algebras. We show that every additive 2-local Lie isomorphism Φ of $\mathrm{Alg}\mathcal{N}$ onto $\mathrm{Alg}\mathcal{M}$ has the form $\Phi = \phi + \tau$, where ϕ is an isomorphism or a negative of an anti-isomorphism of $\mathrm{Alg}\mathcal{N}$ onto $\mathrm{Alg}\mathcal{M}$, and τ is a linear map from $\mathrm{Alg}\mathcal{N}$ into $\mathbb{C}I$ vanishing on a sum of commutators.

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REFERENCES

[1] S. AYUPOV, K. KUDAYBERGENOV AND A. ALAUADINOV, *2-local derivations on algebras of locally measurable operators*, Ann. Funct. Anal. **4** (2013) 110–117.
[2] K. I. BEIDAR, M. BREŠAR, M. A. CHEBOTAR AND W. S. MARDINDALE III, *On Herstein's Lie map conjectures (I)*, Trans. Amer. Math. Soc. **353** (2001) 4235–4260.
[3] D. BENKOVIČ AND D. EREMITA, *Commuting traces and commutativity preserving maps on triangular algebras*, J. Algebra. **280** (2004) 797–824.
[4] M. BREŠAR, *Commuting traces of biadditive mappings, commutativity-preserving mappings and Lie mappings*, Trans. Amer. Math. Soc. **335** (1993) 525–546.
[5] R. L. CRIST, *Local derivations on operator algebras*, J. Funct. Anal. **135** (1996) 76–92.
[6] K. R. DAVIDSON, *Nest Algebras*, Pitman Research Notes in Mathematics, Vol. 191, Longman, London, New York (1988).
[7] J. A. ERDOS, *Operators of finite rank in nest algebras*, J. London Math. Soc. **43** (1968) 391–397.
[8] D. HADWIN, J. LI, *Local derivations and local automorphisms*, J. Math. Anal. Appl. **290** (2004) 702–714.
[9] J. HOU, X. ZHANG, *Ring isomorphisms and linear or additive maps preserving zero products on nest algebras*, Linear Algebra Appl. **387** (2004) 343–360.
[10] L. HUANG AND F. LU, *2-local Lie isomorphisms of operator algebras on Banch spaces*, submited.
[11] W. JING, *Local derivations of reflexive algebras*, Proc. Amer. Math. Soc. **125** (1997) 869–873.
[12] B. E. JOHNSON, *Local derivations on C^*-algebras are derivations*, Trans. Amer. Math. Soc. **353** (2000) 313–325.
[13] S. KIM AND J. KIM, *Local automorphisms and derivations on M_n*, Proc. Amer. Math. Soc. **132** (2004) 1389–1392.
[14] D. R. LARSON AND A. R. SOUROUR, *Local derivations and local automorphisms of B(X)*, Proc. Sympos. Pure Math. **51** (1990) 187–194.
[15] Y. LIN AND T. WONG, *A note on 2-local maps*, Proc. Edinb. Math. Soc. **49** (2006) 701–708.
[16] L. W. MARCOUX AND A. R. SOUROUR, *Lie isomorphisms of nest algebras*, J. Funct. Anal. **164** (1999) 163–180.
[17] W. S. MARDINDALE III, *Lie isomorphisms of prime rings*, Trans. Amer. Math. Soc. **142** (1969) 437–455.
[18] C. R. MIERS, *Lie isomorphisms of factors*, Trans. Amer. Math. Soc. **147** (1970) 55–63.
[19] L. MOLNAR, *Local automorphisms of operator algebras on Banach space*, Proc. Amer. Math. Soc. **131** (2003) 1867–1874.
[20] R. V. KADISON, *Local derivations*, J. Algebra. **130** (1990) 494–509.
[21] J. R. RINGROSE, *On some algebras of operators*, Proc. Lond. Math. Soc. **15** (1965) 61–83.

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[22] J. R. RINGROSE, *On some algebras of operators II*, Proc. London Math. Soc. **16** (1966) 385–402.
[23] P. ŠEMRL, *Local automorphisms and derivations on B(H)*, Proc. Amer. Math. Soc. **125** (1997) 2677–2680.