



LIE IDEALS IN PROPERLY INFINITE C^* -ALGEBRAS

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Abstract: We show that every Lie ideal in a unital, properly infinite C^* -algebra is commutator-equivalent to a unique two-sided ideal. It follows that the Lie ideal structure of such a C^* -algebra is concisely encoded by its lattice of two-sided ideals. This answers a question of Robert in this setting.

We obtain similar structure results for Lie ideals in unital, real rank zero C^* -algebras without characters. As an application, we show that every Lie ideal in a von Neumann algebra is related to a unique two-sided ideal, which solves a problem of Brešar, Kissin, and Shulman.

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Key words: Lie ideals, C^* -algebras, properly infinite, von Neumann algebras, commutators, square-zero elements.