On Lie isomorphisms of rings

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An associative ring A gives rise to the Lie ring $A^{(-)} = (A, [a, b] = ab - ba)$. We prove that if the identity element of A decomposes into a sum of at least three full orthogonal idempotents, then any isomorphism from the Lie ring $[A, A]$ to the Lie ring $[B, B]$ is standard. We also discuss a version for non-unital A and then apply it to the describe automorphisms and derivations of Lie algebras of infinite matrices.

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