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Split Regular Hom-Lie Algebras

We introduce the class of split regular Hom-Lie algebras as the natural extension of the one of split Lie algebras. We study its structure by showing that an arbitrary split regular Hom-Lie algebra \mathfrak{L} is of the form $L = U + \sum_j I_j$, where U is a certain linear subspace of a maximal abelian subalgebra of \mathfrak{L} and the I_j are well described (split) ideals of \mathfrak{L} satisfying $[I_j, I_k] = 0$ if $j \neq k$. Under certain conditions, the simplicity of \mathfrak{L} is characterized and it is shown that \mathfrak{L} is the direct sum of the family of its simple ideals.

Keywords: Hom-Lie algebra, roots, root space, structure theory.

MSC: 17A30, 17A60, 17B65, 17B22