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On the Chevalley-Eilenberg cohomology of some infinite-dimensional algebras of geometric origin

We give a complete and explicit description of the derivations of the Lie algebra $D(M)$ of all linear differential operators of a smooth manifold M , of its Lie subalgebra $D^1(M)$ of all linear first-order differential operators of M , and of the Poisson algebra $S(M) = Pol(T^*M)$ of all polynomial functions on T^*M , the symbols of the operators in $D(M)$. The problem of distinguishing those derivations that generate one-parameter groups of automorphisms and describing these one-parameter groups will also be solved.