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Central Extensions of the Lie Algebra of Symplectic Vector Fields

For a perfect ideal \mathfrak{h} of the Lie algebra \mathfrak{g} , the extendibility of continuous 2-cocycles from \mathfrak{h} to \mathfrak{g} is studied, especially for 2-cocycles of the form $\langle [X, \cdot], \cdot \rangle$ on \mathfrak{h} with $X \in \mathfrak{g}$, when a \mathfrak{g} -invariant symmetric bilinear form $\langle \cdot, \cdot \rangle$ on \mathfrak{h} is available. The results are then applied to extend continuous 2-cocycles from the Lie algebra of Hamiltonian vector fields to the Lie algebra of symplectic vector fields on a compact symplectic manifold.

Keywords: Central extension, symplectic and Hamiltonian vector field.

MSC: 17B56, 17B66