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The method of averaging for Poisson connections on foliations and its applications. (English)

Zbl 1456.53064
J. Geom. Mech. 12, No. 3, 343-361 (2020).

Summary: On a Poisson foliation equipped with a canonical and cotangential action of a compact Lie group, we describe the averaging method for Poisson connections. In this context, we generalize some previous results on Hannay-Berry connections for Hamiltonian and locally Hamiltonian actions on Poisson fiber bundles. Our main application of the averaging method for connections is the construction of invariant Dirac structures parametrized by the 2-cocycles of the de Rham-Casimir complex of the Poisson foliation.

MSC:

53D17 Poisson manifolds; Poisson groupoids and algebroids
53C12 Foliations (differential geometric aspects)
53D20 Momentum maps; symplectic reduction
58D19 Group actions and symmetry properties
70G45 Differential geometric methods (tensors, connections, symplectic, Poisson, contact, Riemannian, nonholonomic, etc.) for problems in mechanics

Keywords:

Poisson foliation; cotangential group action; invariant Ehresmann connections; averaging method; premomentum map; Dirac structure

Full Text: DOI

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