Evens, Sam; **Lu, Jiang-Hua**; **Weinstein, Alan**

Transverse measures, the modular class and a cohomology pairing for Lie algebroids. (English) Zbl 0968.58014

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For any Lie algebroid A over a manifold P [see *I. Vaisman*, "Lectures on the geometry of Poisson manifolds" (1994; Zbl 0810.53019) and *A. Weinstein*, J. Geom. Phys. 23, No. 3-4, 379-394 (1997; Zbl 0902.58013)], a representation of A on the line bundle $Q_A = \wedge^{\text{top}} A \otimes \wedge^{\text{top}} T^* P$ is constructed. In the case when A is the sub-bundle of TP tangent to a foliation $\mathcal{F}$, sections of Q_A are the transverse measures to $\mathcal{F}$, by analogy with the top exterior power of Bott connection.

Two applications are proposed:

1) Every representation of A on a line bundle defines a 'characteristic class' in the first Lie algebroid cohomology of A with trivial coefficients. For the representation on Q_A we get the modular class of A. When A is the cotangent bundle Lie algebroid T^*P of a Poisson manifold P we get the representation of A on the 'square root' $\wedge^{\text{top}} T^* P$ of Q_A. The corresponding characteristic class of A is then the modular class of the Poisson structure, and the Poisson homology is isomorphic to the Lie algebroid cohomology of $A = T^*P$ with coefficients in $\wedge^{\text{top}} T^* P$.

2) A pairing between the Lie algebroid cohomology spaces of A with trivial coefficients and with coefficients in Q_A, like the Poincaré duality for Lie algebra cohomology and de Rham cohomology, is established.

Reviewer: Maido Rahula (Tartu)

MSC:

58H05	Pseudogroups and differentiable groupoids
58A12	de Rham theory in global analysis
58A30	Vector distributions (subbundles of the tangent bundles)
53D17	Poisson manifolds; Poisson groupoids and algebroids
22A22	Topological groupoids (including differentiable and Lie groupoids)

Keywords:

line bundle; Lie algebroid cohomology

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