

23(5)

## Jacobi structures on affine bundles

J. GRABOWSKI(1), D. IGLESIAS(2), J. C. MARRERO(3), E. PADRON(3), P. URBANSKI(4)

(1)Mathematical Institute, Polish Academy of Sciences \Sniadeckich 8, P. O. Box 21, 00--956 Warsaw, Poland; (2)Instituto de Matemáticas y Física Fundamental, Consejo Superior de Investigaciones Científicas, Serrano 123, 28006 Madrid, Spain; (3)Departamento de Matemática Fundamental, Facultad de Matemáticas, Universidad de la Laguna, La Laguna, Tenerife, Canary Islands, Spain; (4)Division of Mathematical Methods in Physics,

University of Warsaw Ho\za 74, 00--682 Warsaw, Poland

收稿日期 2004-8-12 修回日期 网络版发布日期 2007-4-12 接受日期 2005-2-28

摘要

关键词 [Vector and affine bundles](#) [Jacobi manifolds](#) [Lie algebroids](#)

分类号 [53D17](#)

## Jacobi structures on affine bundles

J. GRABOWSKI(1), D. IGLESIAS(2), J. C. MARRERO(3), E. PADRON(3), P. URBANSKI(4)

(1)Mathematical Institute, Polish Academy of Sciences \Sniadeckich 8, P. O. Box 21, 00--956 Warsaw, Poland; (2)Instituto de Matemáticas y Física Fundamental, Consejo Superior de Investigaciones Científicas, Serrano 123, 28006 Madrid, Spain; (3)Departamento de Matemática Fundamental, Facultad de Matemáticas, Universidad de la Laguna, La Laguna, Tenerife, Canary Islands, Spain; (4)Division of Mathematical Methods in Physics,

University of Warsaw Ho\za 74, 00--682 Warsaw, Poland

**Abstract** We study affine Jacobi structures (brackets) on an affine bundle  $\pi: A \rightarrow M$ , i.e. Jacobi brackets that close on affine functions. We prove that if the rank of  $A$  is non-zero, there is a one-to-one correspondence between affine Jacobi structures on  $A$  and Lie algebroid structures on the vector bundle  $A^+ = \bigcup_{p \in M} \text{Aff}(A_p, \mathbb{R})$  of affine functionals. In the case  $\text{rank} A = 0$ , it is shown that there is a one-to-one correspondence between affine Jacobi structures on  $A$  and local Lie algebras on  $A^+$ . Some examples and applications, also for the linear case, are discussed. For a special type of affine Jacobi structures which are canonically exhibited (strongly-affine or affine-homogeneous Jacobi structures) over a real vector space of finite dimension, we describe the leaves of its characteristic foliation as the orbits of an affine representation. These affine Jacobi structures can be viewed as an analog of the Kostant--Arnold--Liouville linear Poisson structure on the dual space of a real finite-dimensional Lie algebra.

**Key words** [Vector and affine bundles](#) [Jacobi manifolds](#) [Lie algebroids](#)

DOI: 10.1007/s10114-005-0716-0

通讯作者 J. GRABOWSKI [jgrab@impan.gov.pl](mailto:jgrab@impan.gov.pl)

### 扩展功能

#### 本文信息

▶ [Supporting info](#)

▶ [PDF\(0KB\)](#)

▶ [HTML全文\(0KB\)](#)

▶ [参考文献](#)

#### 服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

#### 相关信息

▶ [本刊中 包含“Vector and affine bundles”的 相关文章](#)

▶ [本文作者相关文章](#)

· [J GRABOWSKI](#)

· [D IGLESIAS](#)

· [J C MARRERO](#)

· [E PADRON](#)

· [P URBANSKI](#)