

# ON THE SPACE OF CURVATURE TENSORS OF A MANIFOLD WITH GRASSMANN STRUCTURE

N. Bokan, P. Matzeu and Z. Rakić

## Abstract

We study the vector space of curvature tensors,  $\mathcal{R}(G)$ , of torsion free connections with holonomy group  $G = GL(p, \mathbb{R}) \otimes GL(q, \mathbb{R})$ , which is naturally connected with the study of the geometry and topology of manifolds with Grassmann structure. The complete decomposition of  $\mathcal{R}(G)$  under the action of  $G$  is obtained. The highest weight vectors are provided. It was shown that the Weyl projective curvature tensor has more complicated algebraic structure than in the cases of  $GL(n, \mathbb{R})$  being a holonomy group. This decomposition imply a lot of geometrical properties (in the framework of transformation groups, harmonic normalization, half-flat Grassmann connections, etc.). We consider also the same problem for the vector space of covariant derivative of curvature tensors.

**Key Words:** holonomy group, space of curvature tensors, Grassmann manifold, Grassmann connection, normalization, torsion-free connection, action of a group, simple  $G$ -modules.

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Affiliation of authors:

Neda Bokan

*Faculty of Mathematics, University of Belgrade, Studentski trg 16, PP 550,  
11001 Belgrade, Serbia,  
e-mail:neda@matf.bg.ac.yu*

Paola Matzeu

*Dipartimento di Matematica,  
Viale Merello 92,  
09123 Cagliari, Italy,  
e-mail:matzeu@vaxca1.unica.it*

Zoran Rakić

*Faculty of Mathematics, University of Belgrade, Studentski trg 16, PP 550,  
11001 Belgrade, Serbia,  
e-mail:zrakic@matf.bg.ac.yu*