Verbovetskij, A. M.; **Vinogradov, A. M.**; **Gessler, D. M.**

Scalar differential invariants and characteristic classes of homogeneous geometrical structures. (English. Russian original) Zbl 0814.57019

Math. Notes 51, No. 6, 543-549 (1992); translation from Mat. Zametki 51, No. 6, 15-26 (1992).

It was pointed out in [*A. M. Vinogradov*, Scalar differential invariants, diffieties and characteristic classes, in: 'Mechanics, analysis and geometry: 200 years after Lagrange, 379-414 (1991; Zbl 0735.57012)], the relationship between the algebra of scalar differential invariants of homogeneous geometrical structures and their characteristic classes, namely, that the characteristic classes are the cohomology classes of the regular $\mathbb{R}$-spectrum of the corresponding algebra of differential invariants.

In the present paper the next step is taken up and the cohomology of the above-mentioned regular $\mathbb{R}$-spectrum is computed. Namely, it is shown that this cohomology coincides with the cohomology of the classifying space BG of the subgroup G of the general differential group $\mathbb{G}^p(n)$ that defines the relevant geometrical structure of order p. For example, the characteristic classes of pseudo-Riemannian metrics of type (ℓ, m) are exhausted by the cohomology classes $H^i(\mathrm{BSO}(\ell, m))$, $0 \leq i \leq \ell+m$, and the characteristic classes of their s-dimensional bordisms by the cohomology classes $H^{\ell+m+s}(\mathrm{BSO}(\ell, m))$, $s > 0$.

Reviewer: V.L.Popov (Moskva)

MSC:

57R15 Specialized structures on manifolds (spin manifolds, framed manifolds, etc.)
57R20 Characteristic classes and numbers in differential topology
55R40 Homology of classifying spaces and characteristic classes in algebraic topology

Keywords:

cohomology of regular $\mathbb{R}$-spectrum; algebra of scalar differential invariants; homogeneous geometrical structures; characteristic classes; classifying space