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A NOTE ON THE THEOREM OF PASTERNAK

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In this paper a special connection is proposed to be used in the proof of a Pasternak's theorem. This does not furnish a new argument but it clarifies and simplifies the proof of the Theorem (c. f. [6]).

Let $\mathcal{F}$ be a smooth Riemannian foliation of codimension q on a smooth manifold M. Then for $Q=TM/T\mathcal{F}$ — the transversal bundle to

$$\mathrm{Pont}^r(Q, \mathbb{R})=0 \text{ for } r>q.$$

Moreover, if Q is orientable, then

$$\mathrm{Pont}^r_\chi(Q, \mathbb{R})=0 \text{ for } r>q.$$

Let g be an arbitrary bundle-like metric associated to the Riemannian foliation $\mathcal{F}$ (c. f. [7]). Let us denote by λ the natural projection of the bundle $B(M)$ of linear frames onto the bundle $B_T(M)$ of the transversal frames of $(M, \mathcal{F})$ (c. f. [1]). If ω_T is the transversal Levi-Civita connection in $B_T(M)$ (c. f. [5]) then there exist many connections in $B(M)$ which correspond to ω_T under the projection λ. One of them is the metric (with respect to g) connection ω with the torsion tensor

$$\Sigma(X, Y)=-T(X, Y)+T(Y, X)-2A(X, Y)+2A(Y, X),$$

where the tensors T and A are defined in [2]. This connection plays a special role as it is shown in [4]. By the simple calculations we obtain that the forms representing the Pontriagin classes as well as the Euler class (c. f. [3]) are zeros for this connection for mentioned dimensions. What proves the above theorem.

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