

Prolongation of Linear Semibasic Tangent Valued Forms to Product Preserving Gauge Bundles of Vector Bundles

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ABSTRACT

Let A be a Weil algebra and V be an A -module with $\dim_{\mathbf{R}} V < \infty$. Let $E \rightarrow M$ be a vector bundle and let $T^{A,V}E \rightarrow T^A M$ be the vector bundle corresponding to (A, V) . We construct canonically a linear semibasic tangent valued p -form $\mathcal{T}^{A,V}\varphi : T^{A,V}E \rightarrow \wedge^p T^* T^A M \otimes_{T^A M} T T^{A,V}E$ on $T^{A,V}E \rightarrow T^A M$ from a linear semibasic tangent valued p -form $\varphi : E \rightarrow \wedge^p T^* M \otimes TE$ on $E \rightarrow M$. For the Frolicher-Nijenhuis bracket we prove that $[[\mathcal{T}^{A,V}\varphi, \mathcal{T}^{A,V}\psi]] = \mathcal{T}^{A,V}([\varphi, \psi])$ for any linear semibasic tangent valued p - and q -forms φ and ψ on $E \rightarrow M$. We apply these results to linear general connections on $E \rightarrow M$.

Key words: Weil algebra, Weil module, bundle functor corresponding to Weil module, linear semibasic tangent valued form, Frolicher-Nijenhuis bracket, natural operator, linear general connection, curvature of linear general connection.

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