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# Complexes of differential forms associated with a normalized manifold over the algebra of dual numbers

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## Abstract

© 2016, Pleiades Publishing, Ltd. We construct some complexes of differential forms on a smooth manifold  $M_nD$  over the algebra of dual numbers  $D$  on the base of a decomposition of the tensor product  $TM_nD \otimes \mathbb{R}D$  into the Whitney sum of two subbundles. It is shown that these complexes can be obtained as restrictions of some complexes of holomorphic ( $D$ -smooth) forms defined on the tangent bundle  $TM_nD$ . For holomorphic fiber bundles over  $M_nD$ , we introduce complexes of  $D$ -valued forms holomorphic along the fibers and express in terms of cohomology classes of such complexes the obstructions to existence of holomorphic connections in holomorphic principal bundles.

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## Keywords

Almost tangent structure, Atiyah class, manifold over the algebra of dual numbers, manifold over Weil algebra, tangent bundle, tangent manifold