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Homogeneous Principal Bundles over Manifolds with Trivial Logarithmic Tangent Bundle

Winkelmann considered compact complex manifolds X equipped with a reduced effective normal crossing divisor $D \subset X$ such that the logarithmic tangent bundle $TX(-\log D)$ is holomorphically trivial. He characterized them as pairs (X, D) admitting a holomorphic action of a complex Lie group \mathbb{G} satisfying certain conditions (see J. Winkelmann, *On manifolds with trivial logarithmic tangent bundle*, Osaka J. Math. 41 (2004) 473–484; and *On manifolds with trivial logarithmic tangent bundle: the non-Kähler case*, Transform. Groups 13 (2008) 195–209); this \mathbb{G} is the connected component, containing the identity element, of the group of holomorphic automorphisms of X that preserve D . We characterize the homogeneous holomorphic principal H -bundles over X , where H is a connected complex Lie group. Our characterization says that the following three statements are equivalent:

- (1) E_H is homogeneous.
- (2) E_H admits a logarithmic connection singular over D .
- (3) The family of principal H -bundles $\{g^*E_H\}_{g \in \mathbb{G}}$ is infinitesimally rigid at the identity element of the group \mathbb{G} .

Keywords: Logarithmic connection, homogeneous bundle, semi-torus, infinitesimal rigidity.

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