Dolbeault cohomology of left-invariant complex structures on semisimple compact Lie groups

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Abstract: First, in order to understand the statement of a theorem by Bott (Homogeneous vector bundles, Ann. Math. (1957), 203–248) we will see a brief exposition of the theory of cohomology of Lie algebras. As an application, we will see how to use it to prove that the study of the Dolbeault cohomology of left-invariant complex structures on semisimple compact Lie groups can be reduced to the study a purely algebraic problem: the study of Dolbeault cohomology of complex structures on semisimple compact Lie algebras. This approach was first used by Pittie (The Dolbeault-cohomology ring of a compact, even-dimensional Lie group, Proc. Math. Sc., 98(2) (1988), 117–152).