

Cohen, N.; Pinzon, S.**An extension of the (1,2)-symplectic property for f -structures on flag manifolds.** (English. Russian original) [Zbl 1161.53065](#)[Izv. Math. 72, No. 3, 479-496 \(2008\)](#); translation from *Izv. Ross. Akad. Nauk, Ser. Mat.* 72, No. 3, 69-88 (2008).

An f -structure on a Riemannian manifold is a tensor field F of type $(1,1)$ satisfying the condition $F^3 + F = 0$. In the present paper the authors study the $(1,1)$ -symplecticity of an invariant f -structure F on a general flag manifold (M, g) endowed with an invariant Riemannian metric g . This notion is a natural extension of the $(1,2)$ -symplectic condition for almost complex structures.

An f -structure F is said to be $(1,1)$ -symplectic if the $(+, -)$ -part of $d^\nabla F$ vanishes, where ∇ denotes the Riemannian connection of g or, equivalently, if the $(+, -, *)$ -part of $d\sigma$ is zero, where $\sigma(X, Y) = g(X, FY)$ is the Kähler form associated to (F, g) . Given a general flag manifold, the authors characterize in combinatorial terms those invariant f -structures F on a flag manifold M that are $(1,1)$ -symplectic for some invariant Riemannian metric g on M . To this aim, they consider an intersection graph defined in terms of the corresponding root system.

The authors prove that the f -structure is $(1,1)$ -symplectic if the intersection graph is locally transitive.

Reviewer: [Anna Fino \(Torino\)](#)**MSC:**

53C55 Global differential geometry of Hermitian and Kählerian manifolds

22F30 Homogeneous spaces

17B45 Lie algebras of linear algebraic groups

05C20 Directed graphs (digraphs), tournaments

Keywords: f -structures; flag manifolds; $(1,1)$ -symplectic; $(1,2)$ -symplectic; intersection graph; root system**Full Text:** [DOI](#)