SPINORIAL CLASSIFICATION OF Spin(7) STRUCTURES

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Together with the group G_2, Spin(7) appears on Berger's list [2] as an exceptional holonomy group of simply connected, irreducible and non-symmetric Riemannian manifolds. Spin(7) holonomy, which occurs on 8-dimensional manifolds, is homotopically obstructed by the presence of a Spin(7) structure, that is, a reduction to Spin(7) of the frame bundle of the manifold.

The Lie group Spin(7) not only can be regarded as the universal cover of SO(7) but also as the group of isometries of $\mathbb{R}^8$ which preserve a 4-form determined by the standard triple cross product of $\mathbb{R}^8$, constructed from the octonions [6]. Therefore, each Spin(7) structure provides a 4-form Ω, whose differential turns out to measure the lack of integrability of the structure. In addition, Spin(7) structures are classified [3] into 4 types by means of equations for $d\Omega$.

Likewise other geometries, manifolds admitting Spin(7) structures are spin and their spinorial bundle has section which determines the structure [4]. The spinorial approach of SU(3) and G_2 structures [1] has provided an efficient and unified way to describe them. The purpose of this talk is explaining the classification of Spin(7) structures from an spinorial viewpoint. The talk is based in [5] and the starting point is a review of spin geometry and Spin(7) structures.

References

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