

Octonion bundles and isometric G2-structures

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Abstract

Any orientable 7-dimensional manifold that also admits a spin structure also admits a G2-structure, a special geometric structure that can be thought of as a 7-dimensional analog of the vector cross product. A G2-structure then also defines a Riemannian metric on the manifold. Given a fixed G2-structure, we will define an octonion bundle on the manifold, and will show how sections of this bundle define isometric G2-structures, which are G2-structures that correspond to the same Riemannian metric. Finally, we will define a Dirac operator on the octonion bundle and will show how it relates to the torsion of the G2-structure.