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Extra twisted connected sums and their ν-invariants

Thursday, November 8, 2018 2:10 PM (50 minutes)

Joyce's orbifold construction and the twisted connected sums by Kovalev and Corti-Haskins-Nordström-Pacini provide many examples of compact Riemannian 7-manifolds with holonomy G_2. We would like to use this wealth of examples to guess further properties of G_2-manifolds and to find obstructions against holonomy G_2, taking into account the underlying topological G_2-structures.

The Crowley-Nordström ν-invariant distinguishes topological G_2-structures. It vanishes for all twisted connected sums. By adding an extra twist to this construction, we show that the ν-invariant can assume all of its 48 possible values. This shows that G_2-bordism presents no obstruction against holonomy G_2. We also exhibit examples of 7-manifolds with disconnected G_2-moduli space. Our computation of the ν-invariants involves integration of the Bismuth-Cheeger η-forms for families of tori, which can be done either by elementary hyperbolic geometry, or using modular properties of the Dedekind η-function.

Summary

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