

On the classification of vector bundles over 5-manifolds.

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The classification of isomorphism classes of vector bundles over a fixed manifold in terms of computable invariants (e.g. by characteristic classes) is a classical and everlasting problem in topology. In particular in low dimensions such classifications are feasible. For example Woodward [1] succeeded to classify oriented n -dimensional vector bundles over n -manifolds for $n = 3, 4, 6, 7, 8$ in terms of characteristic classes and Čadek and Vanžura [2] for $n = 5$ in case the 5-manifold is not spin.

The case of a spin 5-manifold appears to be somewhat different as the example of the 5-sphere shows: the two isomorphism classes of oriented rank 5 vector bundles over S^5 cannot be distinguished by characteristic classes.

In this talk we will present a classification of rank 5 spin vector bundles over spin 5-manifolds M . For that, we will introduce a bordism theoretic invariant for spin vector bundles over spin manifolds, which is constructed by *framed divisors*. These are the zero loci of generic sections of vector bundles equipped with a natural framing of the normal bundle.

References

- [1] L.M. Woodward, The classification of orientable vector bundles over CW-complexes, *Proc. Roy. Soc. Edinburgh Sect. A* vol. 92, no. 3-4 (1982), pp. 175–179.
- [2] M. Čadek and J. Vanžura, On the classification of oriented vector over 5-complexes, *Czechoslovak Math. J.* vol. 43(118), no. 4 (1993), pp. 753–764.