

A variant of Wall's bordism exact sequence for spin manifolds

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This master thesis relates *Spin*- and *Spin^c*-bordism in a similar way as M. F. Atiyah ([1]) and C. T. C. Wall ([2]) related oriented and non-oriented bordism. The heart piece builds the following long exact sequence relating *Spin*- and *Spin^c*-bordism by a geometrically constructed operator ∂^1 :

$$\dots \longrightarrow \Omega_k^{Spin} \longrightarrow W_k \xrightarrow{\partial^1} \Omega_{k-2}^{Spin} \longrightarrow \Omega_{k-1}^{Spin} \longrightarrow \dots$$

Where W_k is a subgroup of $\Omega_k^{Spin^c}$. Various other sequences get deduced and a structural result about the *Spin^c*-bordism theory gets proven. Namely that there is a geometric splitting for $k \geq 4$

$$\Omega_k^{Spin^c} \cong W_k \oplus \Omega_{k-4}^{Spin^c}$$

To derive these results the *Spin^c-bordism with coefficients* theory gets introduced and a duality theorem gets found by a Pontrjagin-Thom construction. Lastly, the developed theory and results get interpreted homotopy theoretically.

References

- [1] M. F. Atiyah, Bordism and cobordism, *Proc. Cambridge Philos. Soc.* **57** (1961), pp. 200–208.
- [2] C. T. C. Wall, Determination of the cobordism ring, *Annals of Mathematics. Second Series* **72** (1960), pp. 292–311.