The proof of the positive mass conjecture by R. Schoen and S. Yau

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Master thesis in Mathematik

The aim of this master thesis is to understand the proof of the positive mass conjecture given by Richard Schoen and Shing-Tung Yau in 1979. They proved two important theorems about asymptotically flat manifolds that give a connection between the scalar curvature of such a manifold and the total masses of its ends.

To understand the proofs they supplied, we go step by step through them and give proof for any statement that is not immediately obvious. For this, we mainly use methods from Riemannian geometry and geometric measure theory. This means in particular, that it is possible for someone with a basic understanding of Riemannian geometry and geometric measure theory to read this thesis and understand the proofs given by Schoen and Yau.

As there are a lot of important details that are necessary to achieve a sufficient understanding of these proofs, the thesis puts emphasis on the proof of the first theorem.

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