Global solutions of Einstein-Dirac equation on the conformal space

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Abstract

The conformal space $\mathfrak{M}$ was introduced by Dirac in 1936. It is an algebraic manifold with a spin structure and possesses naturally an invariant Lorentz metric. By carefully studying the birational transformations of $\mathfrak{M}$, we obtain explicitly the transition functions of the spin bundle over $\mathfrak{M}$. Since the transition functions are closely related to the propagator in physics, we get a kind of solutions of the Dirac equation by integrals constructed from the propagator. Moreover, we prove that the invariant Lorentz metric together with one of such solutions satisfies the Einstein-Dirac combine equation.