

The Generalized Ricci Curvature on Contact Calabi-Yau 7-Manifolds

AGNALDO ALESSANDRO DA SILVA JUNIOR

UNIVERSIDADE ESTADUAL DE CAMPINAS

The project presents a proof establishing that approximate solutions for the Heterotic G2-system, formulated over Contact Calabi-Yau 7-manifolds, exhibit asymptotic generalized Ricci flatness, in the context of generalized geometry. Generalized geometry, introduced by Nigel Hitchin for the study of string and field theories, has proven to be a powerful tool in both mathematics and physics. Solutions for the heterotic G2-system are naturally embedded in the theory of heterotic Courant algebroids in generalized geometry, where a more general notion of curvature and Ricci curvature is developed. We have used the instanton condition of solutions for the heterotic G2-system to prove generalized Ricci flatness in exact solutions. Interestingly, we observe that the constructed approximate solutions (defined as the zero component, up to higher orders of the string scale, for the curvature in some subspace of 2-form) do not ensure approximate Ricci flatness. An additional condition regarding the behavior of the derivative of the curvature becomes crucial for establishing approximate Ricci flatness. This nuanced approach enhances our understanding of the intricate interplay between geometry and physics in the context of the Heterotic G2-system over Contact Calabi-Yau 7-manifolds.