Abstract

Motivated by the study of Landau-Ginzburg models in string theory from the viewpoint of index theorem, we explore the heat kernel expansion for Schrödinger-type operators on noncompact manifolds. This expansion leads to a local index theorem for such operators.

Unlike in the compact case, the heat kernel in the noncompact setting exhibits new behaviors. Obtaining its precise expansion and deriving a remainder estimate require careful analysis. We will first present our approach to establishing this expansion.

As a key application, we study Weyl's law for such operators. In the compact case, such results follow from Karamata's Tauberian theorem, but the standard Tauberian argument does not apply in the noncompact setting. To address this, we develop a new version of Karamata's theorem.

This is joint work with Xianzhe Dai.