

Fathizadeh Farzad (Swansea)

Curvature and Gauss-Bonnet type theorems in noncommutative geometry

Abstract

I will start by explaining the notion of a spectral triple, which, based on Connes' reconstruction theorem, uses the Dirac operator to encode metric information on a noncommutative algebra. Local curvature related invariants of the algebra can then be detected in the small time heat kernel expansion of the Dirac-Laplacian, and Gauss-Bonnet type results can be investigated. After giving a summary of developments in this direction in recent years, I'll focus on a joint work with Alain Connes in which we calculate the term a_4 in the expansion for curved noncommutative tori and study its properties conceptually. This term contains information about the analog of the Riemann tensor in the noncommutative setting.