



Curved noncommutative torus and Gauss-Bonnet

Ludwik Dabrowski, Andrzej Sitarz

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We study perturbations of the flat geometry of the noncommutative two-dimensional torus T^2_θ (with irrational θ). They are described by spectral triples $(A_\theta, \mathcal{H}, D)$, with the Dirac operator D , which is a differential operator with coefficients in the commutant of the (smooth) algebra A_θ of T_θ . We show, up to the second order in perturbation, that the zeta-function at 0 vanishes and so the Gauss-Bonnet theorem holds. We also calculate first two terms of the perturbative expansion of the corresponding local scalar curvature.

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