

Zeta regularized determinants of the Rumin complex for (2,3,5) geometries

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A generic rank two distribution in dimension five is a tangent 2-plane field on a 5-manifold which is maximally non-integrable, i.e., with growth vector (2,3,5). These intriguing sub-Riemannian geometries have been studied for quite some time from various angles. They can equivalently be described as parabolic geometries associated with the exceptional Lie group G_2 .

In this talk we will focus on spectral properties of the Rumin complex associated with a (2,3,5) distribution. This is a hypoelliptic complex of natural, higher order differential operators that computes the de Rham cohomology. We will discuss recent results on zeta regularized determinants of this complex, and point out some number theoretic aspects related to the case of 5-dimensional nilmanifolds.