Analysis and Applications:
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Talk Title: Joint functional calculus for commuting differential operators on nilpotent groups: Schwartz kernels and multipliers

Abstract:

The prototype of the situation presented here is that of the pair (L; i1T) of self-adjoint operators on the Heisenberg group Hn, where L is the Un-invariant sublaplacian and T is the central derivative. If m is a bounded Borel function on R2, denote by Km the convolution kernel of the operator m(L; i1T). One has the following equivalence: Km 2 S(Hn) if and only if m coincides with a function in S(R2) on the joint spectrum of L and i1T (Astengo, Di Blasio, R., 2007). Let now N be a nilpotent Lie group and K a compact group of automorphisms of N. Assume that (N;K) is a nilpotent Gelfand pair, i.e., that the algebra D(N)K of left-invariant and K-invariant di_erential operators on N is commutative. Given self-adjoint operators D1; : : : ;Dk 2 D(N)K with the property that some polynomial in D1; : : : ;Dk is hypoelliptic, we conjecture that the analogue of the previous statement holds for multiplier operators m(D1; : : : ;Dk). The conjecture has been proved when N = Hn for general K (A-DB-R, 2009), and, more recently, for general pairs (N;K) with n=[n; n] irreducible under K (Fischer, R., Yakimova, in preparation).