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Quantization and canonical representations on symmetric spaces

Vladimir F. Molchanov, Tambov State University.

ABSTRACT

We construct quantizations in the spirit of Berezin on symplectic semisimple symmetric spaces G/H (pseudo-Riemannian). There are two variants depending on sets of functions on G/H. The first one considers rather arbitrary functions, the second one uses polynomials on G/H (the polynomial quantization). For the first variant, one of the main tools is canonical representations. They are representations of G on some function spaces on G/H equipped with an invariant Hermitian form not necessarily positive (negative) definite. They are labelled by a parameter λ. The canonical representations give rise to the so-called boundary representations. The latter act on distributions concentrated at a boundary or, dually, on Taylor series with respect to the boundary. For generic λ, the boundary representations are diagonalizable, but for exceptional λ there are Jordan blocks. The notions of canonical and boundary representations can be generalized to representations on line bundles on G/H. We constructed explicitly for G/H of rank one: both quantizations (in particular, we determined when the correspondence principle is true) and the decomposition of the canonical and the boundary representations. Some constructions from quantizations can be transferred to certain non-symplectic spaces G/H. We succeeded in doing that for hyperboloids of arbitrary signature.