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Sarason's problem in polyanalytics Fock spaces

Polyentire functions generalize entire functions in that they are solutions of "Cauchy-Riemann equations of order n", of the form $\partial^n f/\partial\overline{z}^n = 0$, over the whole complex plane. Polyanalytic Fock space F_n^2 is, by analogy with the classical case, the closed subspace of the Hilbert space $L^2(\mathbb{C}, d\mu)$, where μ is the Gaussian probability measure over $\mathbb{C}$, of polyentire functions of order n ; given a function f, the Toeplitz operator with symbol f is formally defined by $T_f^n(h) = P_{F_n^2}(fh)$, where $P_{F_n^2}$ is the orthogonal projection from $L^2(\mathbb{C}, d\mu)$ onto F_n^2.

The so-called Sarason's problem emerged from the context of the classical Hardy and Bergman spaces of the unit disk $\mathbb{D}$. It consists in finding necessary and sufficient conditions on the symbols f and g for the Toeplitz product with symbols f and $\bar{g}$ to be bounded in the Fock space.

In this talk, we will first review some known results on the classical Fock space ; then I will present some generalizations of these results for polyanalytics Fock spaces. This work is part of my PhD thesis.