Vacuum distribution for sum of gaussian operators on weakly monotone Fock space

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Abstract

In this talk we investigate the distributions of partial sums $S_m := \sum_{i=1}^{m} G_i$, G_i being the position operators $G_i := A_i + A_i^\dagger$ on the weakly monotone Fock space $\mathfrak{F}_{WM}(\mathcal{H})$. We establish the G_i are monotone independent, and moreover any of them has the distribution given by the Wigner semi-circle law with density $\nu(dx) := \frac{1}{2\pi}\sqrt{4-x^2}$ on $[-2,2]$.
We explicitly compute the law for the sum of two position operators, i.e the monotone convolution of the Wigner law by himself, as an absolutely continuous measure w.r.t. the Lebesgue one. Moreover, we state that for $m \geq 3$ the vacuum law is indeed absolutely continuous, symmetric and compactly supported on intervals of the form $[-a_m, a_m]$. Finally, for the endpoints a_m of the intervals above we achieve either a recurrence relation or a nice approximation by lower and upper bounds. From this in particular one has that the sequence $\left(\frac{a_m}{\sqrt{m}}\right)_m$ converges decreasingly to $\sqrt{2}$, as the monotone Central Limit Theorem suggests. This is a joint work with V. Crismale and J. Wysoczanski.