Von Neumann inequalities with respect to weighted symmetric Fock spaces

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The weighted symmetric Fock spaces considered can be realized as reproducing kernel Hilbert spaces of holomorphic functions in the unit ball of $\mathbb{C}^N$. Their kernels are $K_q(z,w) = (1 - \langle z, w\rangle)^{-(1+N+q)}$ for $q > -(1+N)$, and hypergeometric functions for $q \leq -(1+N)$. We also call them Dirichlet spaces, and the case $q = -N$ is the Drury-Arveson space. We obtain inequalities that place upper bounds on the norms of polynomials of row contractions of operators on arbitrary Hilbert spaces in terms of the norms of polynomials of shift operators on these spaces for all q.