Maxwell Orthogonal Polynomials

In the framework of the theory of semiclassical linear functionals in this contribution we deal with the sequence of orthogonal polynomials associated with the linear functional $\langle L, p\rangle = \int_0^\infty p(x)e^{-x^2}dx$, where $p \in \mathbb{P}$, the linear space of polynomials with complex coefficients. The class of L is one and we deduce a differential/difference equation (structure relation) for the sequence of orthogonal polynomials. The Laguerre-Freud equations that the coefficients of the three term recurrence relation satisfy are deduced. The connection with discrete Painlevé IV equations is emphasized. Finally, we analyze the lowering and raising operators (ladder operators) for such polynomials in order to find a second order linear differential equati on they satisfy. As a consequence, an electrostatic interpretation of their zeros is formulated.