

Aurel I. Stan, *A Characterization of q - Gaussian Random Variables in Terms of a Wick Product Identity*

Abstract

If f and g are polynomials and X is a Gaussian random variable, then the Wick product of $f(X)$ and $g(X)$ can be written as an alternating sum of products of powers of the annihilation operator applied to $f(X)$ and $g(X)$. In each term the same power of the annihilation operator is applied to both $f(X)$ and $g(X)$. A natural question arises from this formula, namely, what are the random variables (or equivalently probability distributions), having finite moments of all orders, for which such a formula holds. We show that the answer to this question is: the q -Gaussians.

Keywords: *annihilation and creation operators, Wick product, q {commutator, q - Gaussian.*

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