Quantum Mechanical Version of z-Transform Related to Eigenkets of Boson Creation Operator

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Abstract: Using the completeness relation composed of the coherent state and of the eigenket of bosonic creation operator, we establish a one-to-one correspondence between the z-transform and the quantum-mechanical transform from the representation by number states $|n\rangle$ to the representation by coherent states $|(z)\rangle$ (Bargmann representation). In this way, the quantum-mechanical version of the various properties of z-transform are obtained and the operators for embodying these properties in the Fock space are derived, which may find applications in quantum states engineering.

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