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The Construction of the Semigroup Which Is Chernoff Equivalent to Statistical Mixture of Quantizations for the Case of the Harmonic Oscillator

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Abstract : We obtain explicit formulas of finitely multiple approximations of the equilibrium density matrix for the case of the harmonic oscillator using Chernoff's theorem and the notion of semigroup which is Chernoff equivalent to average semigroup. Also we found explicit formulas for the corresponding approximate Wigner functions and average values of the observable. We consider a superposition of τ -quantizations representing a wide class of linear quantizations. We show that the convergence of the approximations of the average values of the observable is not uniform with respect to the Gibbs parameter. This does not allow to represent approximate expression as the sum of the exact limits and small deviations evenly throughout the temperature range with a given order of approximation.

Keywords : Chernoff theorem, Feynman formulas, finitely multiple approximation, harmonic oscillator, Wigner function
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