

## WIGNER FUNCTION REPRESENTATION IN EIGENFUNCTION BASIS OF HARMONIC OSCILLATOR

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It was Wigner and Weyl who investigated quantum systems in phase space. The Wigner function determines the density of quasi-probabilities of the random radius vector and momentum. Weyl-Wigner-Moyal-Groenewold formalism is widely used. Also Wigner function has a representation as a trace of the product of the density matrix by the kernel operator.

This paper suggests new explicit expressions for the kernel operator in the harmonic oscillator basis. The polynomials obtained within the framework of this paper can be degenerated into Laguerre polynomials in a particular case. It was demonstrated that the diagonal elements of the kernel operator are the Wigner functions of harmonic and off-diagonal elements contain frequency oscillations which are responsible for dissipations in the quantum system. Also the Wigner distribution functions have been constructed in the phase space.

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