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Summary: Let $L_{2,\mu}(\mathbb{R}^2)$, $\mu(x,y) = \exp\{-(-x^2 + y^2)\}$, $\mathbb{R} = (-\infty, +\infty)$, $\mathbb{R}^2 := \mathbb{R} \times \mathbb{R}$, be the space of functions $f$, for which $\mu^{1/2} f \in L_2(\mathbb{R}^2)$. In the metric of space $L_{2,\mu}(\mathbb{R}^2)$, the sharp inequalities of Jackson-Stechkin type are obtained, which relate the best mean-square approximation by “angle” of functions $f$ from classes $L_{r,\mu}(\mathbb{R}^2)$ and the averaged with the weight $q$ generalized mixed modules of continuity $\Omega_{k,l}(D^r f)$, where

$$D := \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} - 2x \frac{\partial}{\partial x} - 2y \frac{\partial}{\partial y}$$

is the second order Chebyshev differential operator.

MSC:

41Axx Approximations and expansions
42Axx Harmonic analysis in one variable
33-XX Special functions

Keywords:
best approximation by “angle”; translation operator; weight function; Chebyshev-Hermite operator; generalized module of continuity

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