Physics 472 - 2020
Quantum Mechanics
Quiz 2

Your name:

Consider a smooth function $f(\phi)$ of the azimuthal angle ϕ. Find $\exp(-i\epsilon \hat{L}_z/\hbar)f(\phi)$ [1]

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[1] for experts in the theory of complex variables: assume that the radius of convergence of $f(\phi)$ for the considered ϕ exceeds ϵ

Your name:

Extra problem

Consider a particle of mass m in a two-dimensional potential box. The potential is

$$U(x,y) = 0 \quad \text{for } x^2 + y^2 < R^2, \qquad U(x,y) \to \infty \quad \text{for } x^2 + y^2 > R^2$$

The Hamiltonian is $H = \frac{1}{2m}(p_x^2 + p_y^2) + U(x,y)$.

Estimate the energy of the lowest eigenstate.