
Exercises

Exercise 5 :

In the position space $\{|\vec{r}\rangle\}$, the geometric transformation origin inversion is defined as:

$$\Pi |\vec{r}\rangle = |-\vec{r}\rangle,$$

Π represents the parity operator.

1. Calculate $\Pi |\vec{p}\rangle$
2. Calculate $\Pi |\psi(t)\rangle$
3. The transformed \vec{A}' of an operator \vec{A} is defined by $\vec{A}' \equiv \Pi \vec{A} \Pi^{-1}$. Calculate the transforms of the position, momentum, and angular momentum operators given respectively by $\vec{R}' \equiv \Pi \vec{R} \Pi^{-1}$, $\vec{P}' \equiv \Pi \vec{P} \Pi^{-1}$ and $\vec{L}' \equiv \Pi \vec{L} \Pi^{-1}$