②

旧文法版量子力学で対象系を定義

2つの自由度、オブザーバブル: X, Y ・・・ エルミート $X^\dagger = X, Y^\dagger = Y$ $\Big\}$ $Z \equiv X + iY$

量子化条件 $ZZ^\dagger + Z^\dagger Z = 1, \quad ZZ = 0$

$$[Z, Z^\dagger]_+ = 1, \quad [Z, Z]_+ = 0$$

状態空間 $Z^\dagger Z|\lambda> = \lambda|\lambda>$

$$\begin{aligned}\lambda(\lambda-1)|\lambda> &= Z^\dagger Z(Z^\dagger Z - 1)|\lambda> \\ &= Z^\dagger Z(-ZZ^\dagger)|\lambda> \\ &= 0 \quad \because ZZ = 0\end{aligned}$$

$\therefore \quad \lambda = 0$ or 1 　　基底 $= \{|0>, |1>\}$

ハミルトニアン $H = AZ^\dagger Z \quad (A > 0)$

シュレディンガー方程式 $i\hbar\dfrac{d}{dt}|\Psi(t)> = H|\Psi(t)>$

$$|\Psi(t)> = \phi(0,t)|0> + \phi(1,t)|1>$$

$$i\hbar\frac{d}{dt}\phi(0,t) = 0, \quad i\hbar\frac{d}{dt}\phi(1,t) = A\phi(1,t)$$

$$\phi(0,t) = c_0, \qquad \phi(1,t) = c_1 \exp\left(-i\frac{A}{\hbar}t\right)$$