

Probleme 1

cond. initial:

$$|\psi(t=0)\rangle = \frac{1}{\sqrt{3}} |\varphi_0\rangle + i\sqrt{\frac{2}{3}} |\varphi_1\rangle$$

$$\begin{aligned} (a) \quad |\psi(t)\rangle &= e^{-\frac{i}{\hbar} \hat{H} t} |\psi(0)\rangle \\ &= \frac{1}{\sqrt{3}} e^{-\frac{i}{\hbar} \hat{H} t} |\varphi_0\rangle + i\sqrt{\frac{2}{3}} e^{-\frac{i}{\hbar} \hat{H} t} |\varphi_1\rangle \\ &= \frac{1}{\sqrt{3}} e^{-\frac{i}{\hbar} \epsilon_0 t} |\varphi_0\rangle + i\sqrt{\frac{2}{3}} e^{-\frac{i}{\hbar} \epsilon_1 t} |\varphi_1\rangle \end{aligned}$$

donc: $\epsilon_0 = \frac{\hbar \Omega}{2}$, $\epsilon_1 = \frac{3}{2} \hbar \Omega$.

$$(b) \quad P_0 = |\langle \varphi_0 | \psi(t) \rangle|^2 = \frac{1}{3}$$

$$P_1 = |\langle \varphi_1 | \psi(t) \rangle|^2 = \frac{2}{3}$$