11. \( h_\theta = a(\theta + 2\pi) \). Boundary condition

\[
\int_0^{2\pi} \rho^2 \, \text{d}\theta = 1. \quad \text{Normalization condition.}
\]

Above condition is fulfilled by the \( \rho = \frac{1}{\sqrt{2\pi}} e^{-\frac{\theta^2}{2}} \) (where \( h = e^{-\frac{\theta^2}{2}} \)).

\[
\rho(\theta) = \frac{1}{\sqrt{2\pi}} e^{-\frac{\theta^2}{2}}.
\]

\[
\langle h_\theta | h_\theta \rangle = \frac{1}{2\pi} \int_0^{2\pi} e^{-\theta^2} e^{-\theta^2} \, \text{d}\theta = \frac{1}{2\pi} \int_0^{2\pi} e^{-2\theta^2} \, \text{d}\theta
\]

\[
= \frac{1}{2\pi} \frac{1}{\sqrt{2\pi}} \left( 1 - e^{-4\pi^2} \right)
\]

If \( \theta = \pi \) then \( \langle h_\theta | h_\theta \rangle = 0 \).

If \( \theta = \pi \) then \( \langle h_\theta | h_\theta \rangle = 0 \) type of finite value. (In fact, it's one.)

So: \( \langle h_\theta | h_\theta \rangle = \delta_{\theta, \pi} e^{-\delta_{\theta, \pi}} = \text{Kronecker delta}. \)

5. Just prime note...