L^2
$L^2(R^n)$
$\{h_k(x):$
$k \in$
$N\}$
$L^2(R).$
$f \in$
$L^2(R)$

$$f(x) = \sum_{k=0}^{\infty} \langle f, h_k \rangle h_k(x)$$

f
$L^2(R)$
$\{h_k(x):$
$k \in$
$N\}$
$f \in$
$L^2(R)$
h_k
$\langle f, h_k \rangle =$
$0, \ \forall \ k.$

$$\begin{aligned} Now, \ \langle f, h_k \rangle &= \int f(y) h_k(y) dy \\ &= \int f(y) h_k(x) h_k(y) dy \\ &= \int f(y) \frac{\tilde{h_k}(x) \tilde{h_k}(y)}{2^k k!} w^k dy \\ &= \int f(y) \left(\sum_{k=0}^{\infty} \frac{\tilde{h_k}(x) \tilde{h_k}(y)}{2^k k!} w^k \right) dy \\ &= \int e^{-\frac{1}{2} \frac{1+w^2}{1-w^2}(x^2+y^2) + \frac{2w}{1-w^2} xy} f(y) dy. \end{aligned}$$

$$\int e^{-\frac{1}{2} \frac{1+w^2}{1-w^2}(x^2+y^2) + \frac{2w}{1-w^2} xy} f(y) dy = 0.$$

$|w| <$
$1,$
$w =$
$-ir, 0 <$
$r <$
1

$$\int e^{-\frac{1}{2} \frac{1-r^2}{1+r^2} y^2} . e^{-\frac{2r}{1+r^2} ixy} f(y) dy = 0.$$

$f(y) e^{-\frac{1}{2} \frac{1-r^2}{1+r^2} y^2}$
(2.1.29)
$f =$
$0.$
$L^2(R^n)$