$P_n(\omega) =$
$N_0/2$

$0 :$
$x(t) =$
$n(t), 0 \leq$
$t \leq$
T
$H_1 :$
$x(t) =$
$s(t)+$
$n(t), 0 \leq$
$t \leq$
T
$n(t)$
blue(1)

$$f_1(t) = \frac{1}{\sqrt{E_s}} s(t)$$

$f_1(t) s(t)$
$f_k(t), k \geq$
$2 f_1(t)$
$f_j(t) f_k(t), k \geq 1, j \geq 1, k \neq j$

$.f_1(t)$
$\{f_k(t)\}(k =$
$1, 2, \ldots)$

$$\int_0^T f_j(t) f_k(t) dt = \{ 1 \ , j = k 0, j \neq k$$

$$f_1(t) = \frac{1}{\sqrt{E_s}} s(t) s(t) = \sqrt{E_s} f_1(t)$$

$f_1(t) f_k(t) (k \geq$
$2) s(t) f_k(t) (k \geq$
$2)$
$s(t) f_k(t) (k \geq$
$2) s_k =$
$0, (k \geq$
$2)$

$$s_k = \int_0^T s(t) f_k(t) dt = \int_0^T \sqrt{E_s} f_1(t) f_k(t) dt = \sqrt{E_s} f_1(t) f_k(t)$$

$k =$
$1, f_1(t) f_k(t) =$
$1 s_1 =$
$\sqrt{E_s}, k \geq$
$2, f_1(t) f_k(t) =$
$0 s_k =$
0
$.f_1(t)$
${}_1(t) =$
$\frac{1}{\sqrt{E_s}} s(t) s(t) =$
$\sqrt{E_s} f_1(t)$
$k =$
$1, f_1(t) f_k(t) =$
$1 s_1 =$
$\sqrt{E_s}$
$k \geq$
$2, f_1(t) f_k(t) =$
$0 s_k =$
0
$x(t) =$
$s(t)+$
$n(t), x_k =$
s_k+
$n_k, n(t)$
$x_1 =$
s_1+
$n_1 =$
$\sqrt{E_s}+$
$n_1 x_1$
$s(t)$
$x_k =$
s_k+
$n_k =$
$n_k (k \geq$