

$$\frac{\dot{P}_n(\omega)}{N_0/2}=$$

$$\vdots$$

$$\begin{array}{l} \vdots \\ x(t)= \\ n(t), 0\leq \\ t\leq \\ T \\ H_1: \\ x(t)= \\ s(t)+ \\ n(t), 0\leq \\ t\leq \\ T \\ n(t) \\ \text{blue}(\mathbf{1}) \end{array}$$

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

$$\begin{array}{l} f_1(t)s(t) \\ f_k(t), k\geq \\ 2f_1(t) \\ f_j(t)f_k(t), k\geq 1, j\geq 1, k\neq j \end{array}$$

$$\begin{array}{l} f_1(t) \\ \{f_k(t)\}(k= \\ 1,2,\ldots) \end{array}$$

$$\int_0^T f_j(t)f_k(t)dt=\{1,j=k0,j\neq k$$

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

$$\begin{array}{l} f_1(t)f_k(t)(k\geq \\ 2)s(t)f_k(t)(k\geq \\ 2) \\ s(t)f_k(t)(k\geq \\ 2)s_k= \\ 0,(k\geq \\ 2) \end{array}$$

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

$$\begin{array}{l} k= \\ 1,f_1(t)f_k(t)= \\ 1s_1= \\ \sqrt{E_s},k\geq \\ 2,f_1(t)f_k(t)= \\ 0s_k= \\ 0 \end{array}$$

$$\begin{array}{l} f_1(t) \\ 1(t)= \\ \frac{1}{\sqrt{E_s}}s(t)s(t)= \\ \sqrt{E_s}f_1(t) \\ k= \\ 1,f_1(t)f_k(t)= \\ 1s_1= \\ \sqrt{E_s} \\ k\geq \\ 2,f_1(t)f_k(t)= \\ 0s_k= \\ 0 \\ x(t)= \\ s(t)+ \\ n(t),x_k= \\ s_k+ \\ n_k,n(t) \\ x_1= \\ s_1+ \\ n_1= \\ \sqrt{E_s}+ \\ n_1x_1 \\ s(t) \\ x_k= \\ s_k+ \\ n_k= \\ n_k(k\geq \end{array}$$