

$$= \frac{\sin(n+1/2)}{2 \sin 1/2} +$$

оп. баз. $P_n(x) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ нужно

сигнал

$$B \neq 0 \text{ } P_n(x) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$$

$P_n(x)$ определено $\forall x \in \mathbb{R}$

лемма 2 для $f \in C^1 \Rightarrow [x, y] \in \mathbb{R}$

$$\int_{-x}^x f(t) dt = \int_{-x}^x f(t) \frac{\sin(n+1/2)t}{2 \sin 1/2} dt \quad (8)$$

лемма 3 для $\forall n \geq 0, \Delta \rightarrow 0$

$$\int_{-x}^x f(t) dt = \int_{-x}^x f(t) \frac{\sin(n+1/2)t}{2 \sin 1/2} dt \quad (H)$$

$(a_n, b_n) = 0$ $\forall n \in \mathbb{N}$, $\lim_{n \rightarrow \infty} a_n = a$, $\lim_{n \rightarrow \infty} b_n = b$

$$P_n(x) \text{ не определено } f \equiv 1 \Rightarrow \int_{-x}^x P_n(x) dx = 1$$

н.д. $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2}$

$$\forall f(x) \in L^1[-\pi, \pi], \forall x \in \mathbb{R}$$

* $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2}$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f(x)$

$$S_n(x, f) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f(x) + S_{n-1}(x, f) \quad (6)$$

теорема Дирихле (3) \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2}$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f(x)$

$$\sum_{k=0}^{n-1} \sin(k+1/2) + \frac{\sin(n+1/2)}{2 \sin 1/2} = \frac{1}{2 \sin 1/2} \sum_{k=0}^{n-1} \sin(k+1/2) + \frac{\sin(n+1/2)}{2 \sin 1/2}$$

$$= \frac{1}{2 \sin 1/2} (\cos k + \cos(k+1)) = \frac{1}{2 \sin 1/2} (\cos k - \cos(k+2)) = \frac{1}{2 \sin 1/2} (\cos 0 - \cos(2n)) = \frac{1 - \cos(2n)}{2 \sin 1/2} = \frac{2 \sin^2 n}{2 \sin 1/2} = \frac{\sin^2 n}{\sin 1/2}$$

оп. баз. $P_n(x) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

нужно $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2}$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

лемма 4 \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

$$S_n(x, f) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f(x) + S_{n-1}(x, f) = \frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f(x) + \frac{1}{2} \frac{\sin(n-1/2)}{\sin 1/2} f(x) = \frac{1}{2} \frac{\sin(n+1/2) + \sin(n-1/2)}{\sin 1/2} f(x) = \frac{1}{2} \frac{2 \sin n \cos 1/2}{\sin 1/2} f(x) = \frac{\sin n \cos 1/2}{\sin 1/2} f(x)$$

лемма 5 \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

нужно $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2}$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

1) $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f \geq 0$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$

2) $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f \leq 0$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$ \rightarrow $\frac{1}{2} \frac{\sin(n+1/2)}{\sin 1/2} f$