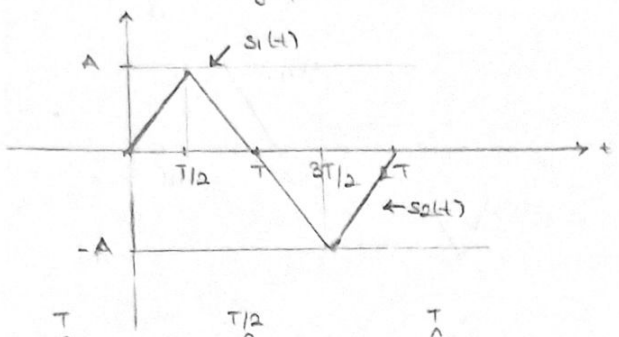
saga T birim kaydırılmış.

$s_1(t) = A \cdot \Lambda\left(\frac{t - T/2}{T/2}\right)$; $s_2(t) = -s_1(t-T)$

← genişlik T



$$s_1(t) = \begin{cases} \frac{2A}{T}t, & 0 \le t \le T/2 \\ -\frac{2A}{T}(t-T), & T/2 \le t \le T \end{cases}$$

$$s_2(t) = \begin{cases} -\frac{2A}{T}(t-T), & T \le t \le 3T/2 \\ \frac{2A}{T}(t-2T), & 3T/2 \le t \le 2T \end{cases}$$

$$E_{s_1} = \int_0^T s_1^2(t)\,dt = \underbrace{\int_0^{T/2}\left(\frac{2A}{T}t\right)^2 dt}_{①} + \underbrace{\int_{T/2}^{T}\left(-\frac{2A}{T}(t-T)\right)^2 dt}_{②} = \frac{A^2T}{3} \quad ; \quad E_{s_2} = \frac{A^2T}{3}$$

$$① \rightarrow \int_0^{T/2} \frac{4A^2}{T^2}t^2\,dt = \frac{4A^2}{T^2}\cdot\frac{t^3}{3}\Big|_0^{T/2} = \frac{4A^2}{T^2}\cdot\frac{T^3}{24} = \frac{A^2T}{6}$$

$$② \rightarrow \int_{T/2}^{T} \frac{4A^2}{T^2}(t^2 + T^2 - 2tT)\,dt = \frac{4A^2}{T^2}\left[\frac{t^3}{3} + T^2 t - T\cdot t^2\right]_{T/2}^{T}$$

$$= \frac{4A^2}{T^2}\left[\frac{T^3}{3} + T^3 - T^3 - \left(\frac{T^3}{24} + \frac{T^3}{2} - \frac{T^3}{4}\right)\right] = \frac{4A^2}{T^2}\cdot\frac{T^3}{24} = \frac{A^2T}{6}$$

(12) (6)

$P_{s_1} = P(1) = 3/5$
$P_{s_2} = P(0) = 2/5$

$$E_b = E_{s_1}\cdot P_{s_1} + E_{s_2}\cdot P_{s_2} = \frac{A^2T}{3}\cdot(1) = 1$$

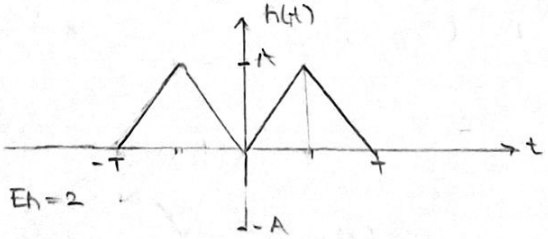
E_b - accepted = 1 olarak kabul edilsin. → $A^2T = 3$ bulunur.

$$a_1 = \int_0^{2T} s_1(t)\cdot[s_1(t) - s_2(t)]\,dt = \int_0^{T} s_1^2(t)\,dt = \frac{A^2T}{3} \rightarrow A^2T = 3 \text{ olduğundan } a_1 = 1$$

$$a_2 = \int_0^{2T} s_2(t)\cdot[s_1(t) - s_2(t)]\,dt = \int_T^{2T} -s_2^2(t)\,dt = -\frac{A^2T}{3} \rightarrow A^2T = 3 \text{ olduğundan } a_2 = -1$$

$h(t) = s_1(T-t) - s_2(T-t)$

$-(t-T)$



$$E_h = \frac{2A^2T}{3} \rightarrow A^2T = 3 \text{ olduğundan } E_h = 2$$

$$\gamma_0 = \frac{\sigma_0^2}{a_1 - a_2}\ln\left(\frac{P_{s_2}}{P_{s_1}}\right) + \frac{a_1 + a_2}{2} = \frac{N_0}{2}\ln\left(\frac{2}{3}\right)$$

; $\sigma_0^2 = \frac{N_0}{2}E_h = N_0$.

$$P_b = \left[1 - Q\left(\frac{\gamma_0 - a_1}{\sigma_0}\right)\right]P(s_1) + Q\left(\frac{\gamma_0 - a_2}{\sigma_0}\right)P(s_2)$$

$$= \underbrace{1 - Q\left(\frac{N_0/2\cdot\ln(3/2) - 1}{\sqrt{N_0}}\right)}_{\text{veya } Q\left(\frac{1 - N_0/2\cdot\ln(3/2)}{\sqrt{N_0}}\right)}\frac{3}{5} + Q\left(\frac{N_0/2\cdot\ln(3/2) + 1}{\sqrt{N_0}}\right)\cdot\frac{2}{5}$$