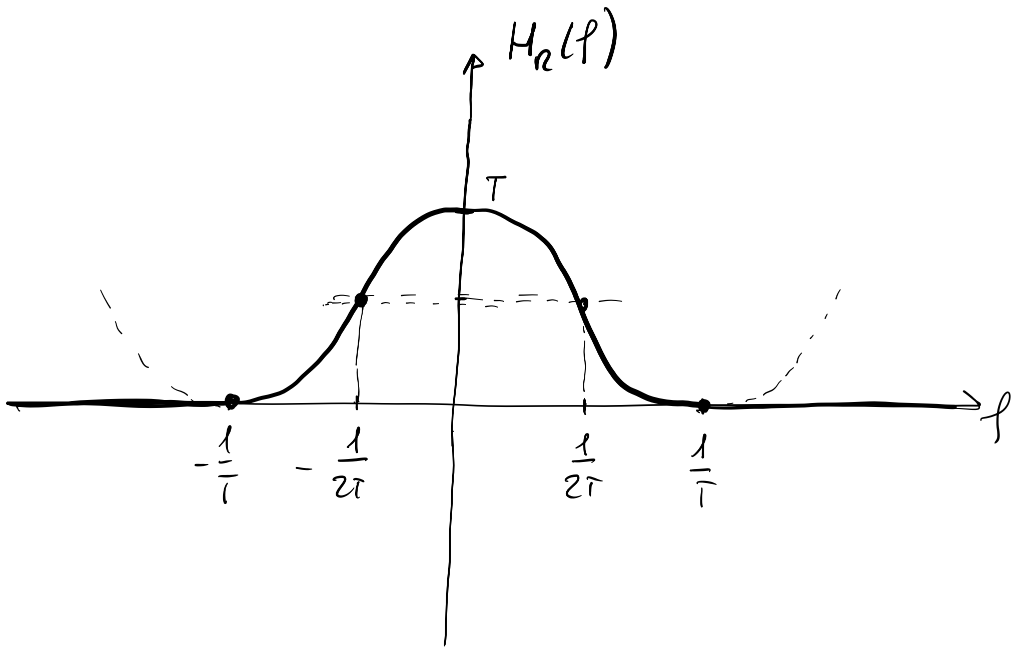
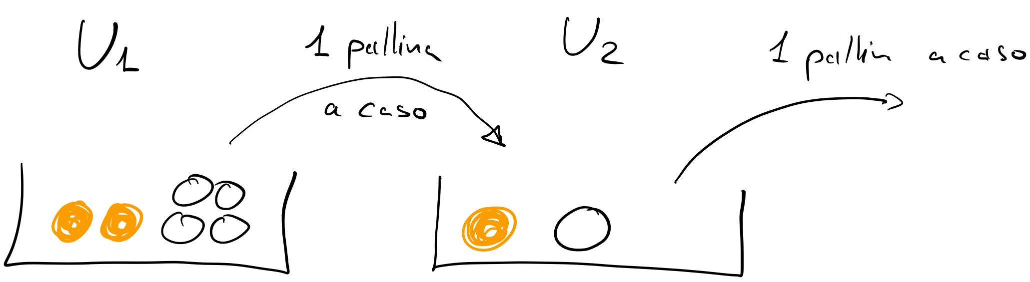
$$H_R(f) = \frac{T}{2}\left(1 + \cos(\pi f T)\right) \mathrm{rect}\left(\frac{fT}{2}\right)$$





$A_1 =$ (pallin arancione estratta da U1)

$A_2 =$ (palline arancione estratta da U2)

$P(A_2) = ?$

TEO DELLA PROB. TOTALE

$$P(A_2) = P(A_2 | A_1)\, P(A_1) + P(A_2 | \bar{A}_1)\, P(\bar{A}_1)$$

$$= \frac{2}{3} \cdot \frac{1}{3} + \frac{1}{3} \cdot \frac{2}{3} = \boxed{\frac{4}{9}}$$

$\Rightarrow P(A_2 | A_1) = \frac{2}{3}$

$\Rightarrow P(A_1) = \frac{1}{3}$

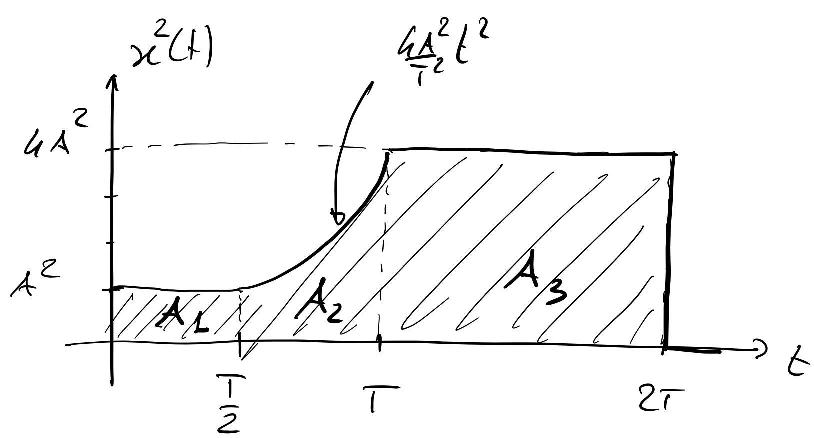
$P(A_2 | \bar{A}_1) = \frac{1}{3}$

$P(\bar{A}_1) = \frac{2}{3}$

TEO. DI BAYES

$$P(A_1 | A_2) = \frac{P(A_2 | A_1)\, P(A_1)}{P(A_2)} = \frac{\frac{2}{3} \cdot \frac{1}{3}}{\frac{4}{9}} = \frac{\cancel{2}^{1}}{\cancel{9}} \cdot \frac{\cancel{9}}{\cancel{4}_{2}} = \frac{1}{2}$$

$$E_x = 2 \int_0^{2T} x^2(t)\, dt = 2 (A_1 + A_2 + A_3)$$



$$A_1 = A^2 \cdot \frac{T}{2}$$

$$A_2 = \int_{\frac{T}{2}}^{T} \frac{4A^2}{T^2} t^2 \, dt = \frac{4A^2}{T^2} \frac{t^3}{3} \Bigg|_{\frac{T}{2}}^{T}$$

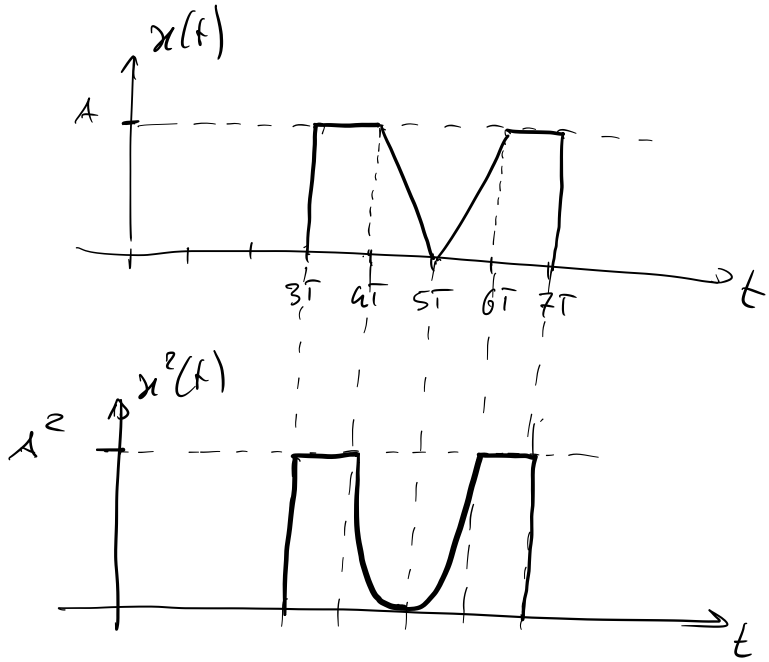
$$= \dots$$

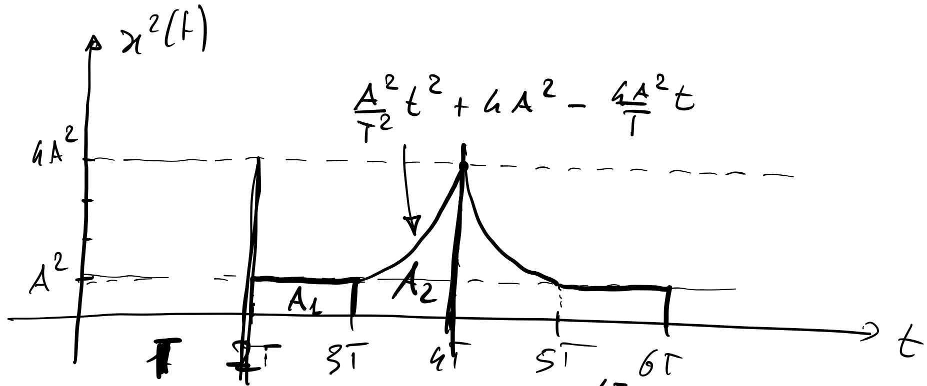
$$A_3 = 4A^2 T$$

$$\frac{T}{2} \leq t \leq T \qquad x(t) = \underline{\underline{a}}\, t = \frac{2A}{T} t$$

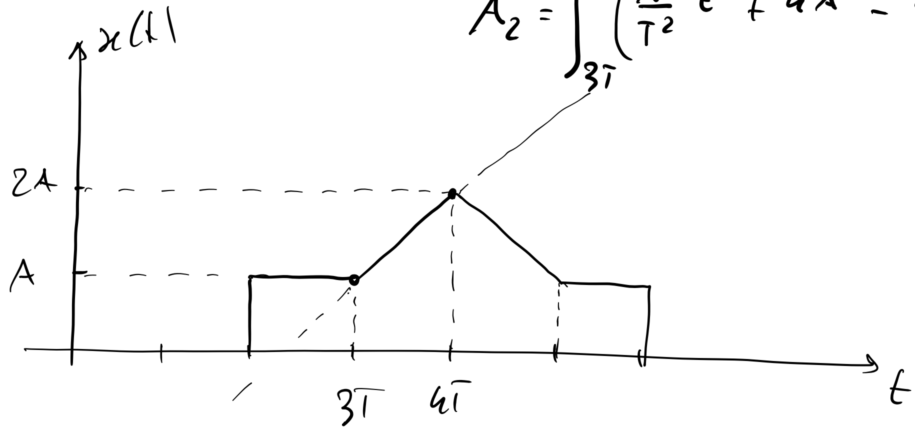
$$x^2(t) = \frac{4A^2}{T^2} t^2$$

$$x(t) = at + \underset{0}{\underset{\shortparallel}{b}}$$





$$A_2 = \int_{3T}^{4T} \left(\frac{A^2}{T^2} t^2 + 4A^2 - \frac{4A^2}{T} t \right) dt$$



$3T \leq t \leq 4T \qquad x(t) = at + b = \frac{A}{T} t - 2A$

$$(3T, A) \Rightarrow a\,3T + b = A$$

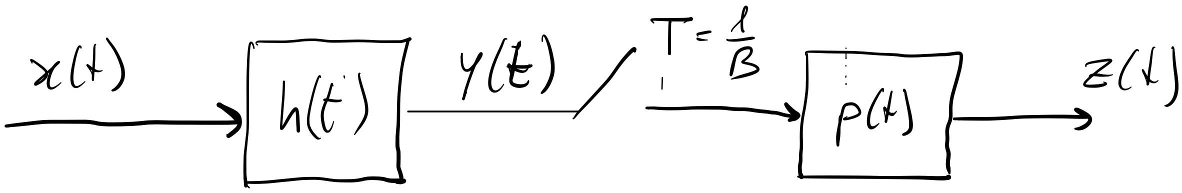
$$(4T, 2A) \Rightarrow a\,4T + b = 2A$$

$$aT = A \Rightarrow a = \frac{A}{T}$$

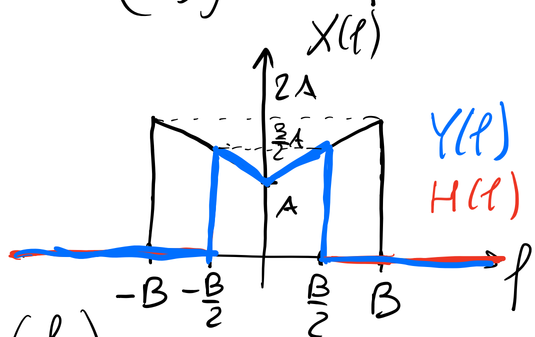
$$\frac{A}{\cancel{T}} 3\cancel{T} + b = A$$

$$b = A - 3A = -2A$$

$$E_x = K < \infty \Rightarrow P_x = 0 \Rightarrow x_{eff} = 0 \Rightarrow x_m = 0$$



$$X(f) = 2A\,\mathrm{rect}\left(\frac{f}{2B}\right) - A\left(1 - \frac{|f|}{B}\right)\mathrm{rect}\left(\frac{f}{2B}\right)$$

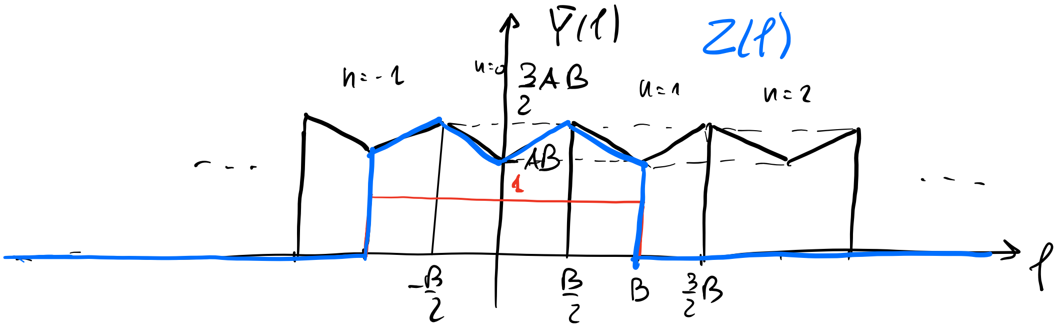


$$H(f) = \mathrm{rect}\left(\frac{f}{B}\right)$$

$$Y(f) = X(f)\,Y(f) = \frac{3}{2}A\,\mathrm{rect}\left(\frac{f}{B}\right) - \frac{A}{2}\left(1 - \frac{|f|}{B/2}\right)\mathrm{rect}\left(\frac{f}{B}\right)$$

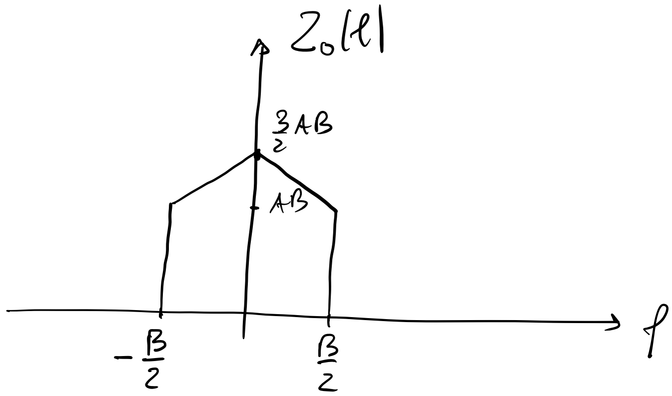
$$y[n] = y(nT) \Rightarrow \overline{Y}(f) = \frac{1}{T}\sum_{n=-\infty}^{+\infty} Y\left(f - \frac{n}{T}\right)$$

$$= B \sum_{n} Y(f - nB)$$



$$Z(f) = \bar{Y}(f)\, P(f) = Z_0\left(f - \frac{B}{2}\right) + Z_0\left(f + \frac{B}{2}\right)$$

$$P(f) = \mathrm{rect}\left(\frac{f}{2B}\right) \qquad Z_0(f) = AB\,\mathrm{rect}\left(\frac{f}{B}\right) + \frac{AB}{2}\left(1 - \frac{|f|}{\frac{B}{2}}\right)\mathrm{rect}\left(\frac{f}{B}\right)$$



$$z(t) = z_0(t)\, e^{j2\pi \frac{B}{2} t} + z_0(t)\, e^{-j2\pi \frac{B}{2} t}$$

$$= 2\, z_0(t)\, \frac{e^{j\pi B t} + e^{-j\pi B t}}{2}$$

$$= 2\, z_0(t) \cos(\pi B t)$$

$$z_0(t) = \mathrm{ATCF}\left[Z_0(f)\right] = AB^2 \mathrm{sinc}(Bt) + \frac{AB^2}{4} \mathrm{sinc}^2\left(\frac{B}{2} t\right)$$

$$z(t) = \left[2AB^2 \operatorname{sinc}(Bt) + \frac{AB^2}{2} \operatorname{sinc}^2\!\left(\frac{B}{2}t\right) \right] \cos(\pi B t)$$