① $C_N^{nk} = \sqrt{\frac{2-\delta(k)}{N}} \cdot \sum_{n=0}^{N-1} \cos\frac{(2n+1)k\pi}{2N}$

$$C_3 = \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & \frac{0}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \\ \frac{1}{\sqrt{6}} & \frac{-2}{\sqrt{6}} & \frac{1}{\sqrt{6}} \end{bmatrix} \qquad C_3^{-1} = \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{0}{\sqrt{2}} & \frac{-2}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{-1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \end{bmatrix}$$

$$C_3 \cdot C_3^T = \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & \frac{0}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \\ \frac{1}{\sqrt{6}} & \frac{-2}{\sqrt{6}} & \frac{1}{\sqrt{6}} \end{bmatrix} \cdot \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{0}{\sqrt{2}} & \frac{-2}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{-1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I$$

$$C_3^T \cdot C_3 = \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{0}{\sqrt{2}} & \frac{-2}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{-1}{\sqrt{2}} & \frac{1}{\sqrt{6}} \end{bmatrix} \cdot \begin{bmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & \frac{0}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \\ \frac{1}{\sqrt{6}} & \frac{-2}{\sqrt{6}} & \frac{1}{\sqrt{6}} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I$$

② Veza između DCT-II i DFT_{4N} transformacija se vidi u tome da kada se signal parno proširi sinusni članovi u DFT transformaciji će se poništiti. A preostali kosinusni članovi će odgovarati članovima C_N matrice.

$$2\,DCT_N[\underbrace{x[n]}_{N}] = DFT_{4N}[\underbrace{y[n]}_{4N}] \cdot \sqrt{\frac{2-\delta(k)}{2}} \quad , \; 0 \le k \le 1$$

$x[n] = \{\underline{2}, 1\} \rightarrow y[n] = \{\underline{0}, 0, 1, 0, 1, 0, 0, 0\}$

$DCT[x(n)] = X[k] = \sqrt{\frac{2-\delta(k)}{2}} \cdot \sum_{n=0}^{2} x[n] \cos\frac{(2n+1)k\pi}{4} = \left\{ \frac{1}{\sqrt{2}}, \cos\frac{2\pi}{4} \right\}$

$DFT_8[y(n)] = Y[k] = \sum_{n=0}^{7} y[n] W_8^{nk} = W_8^{3k} + W_8^{5k} = W_8^{3k} + W_8^{-3k} = 2\cos\left(2\pi \cdot \frac{3k}{8}\right) = \left\{ 2, 2\cdot\cos\left(\frac{6\pi}{8}\right.\right.$

$k=0$: $2 \cdot \frac{1}{\sqrt{2}} = 2 \cdot \sqrt{\frac{2-1}{2}}$

$\frac{2}{\sqrt{2}} = \frac{2}{\sqrt{2}}$ ✓

$k=1$: $2 \cdot \cos\frac{2\pi}{4} = 2\cos\left(\frac{6\pi}{8}\right) \cdot \sqrt{\frac{2-0}{2}}$

$2\cos\frac{2\pi}{4} = 2\cos\frac{2\pi}{4}$ ✓

③ Vrijedi isto kao za prethodni zadatak. Kada funkciju parno proširimo ona ima samo kosinusne članove.

Kada ulazni signal parno i simetrično proširimo vrijedi:

$$DCT\text{-}I_N[x(n)] = \frac{1}{2} DFT_{2N-2}[z[n]] \cdot \sqrt{\frac{2-\delta(k)-\delta(k-N+1)}{N-1}}$$

gdje je $z[n]$ niz koji se dobije kada se prošireni niz pomnoži s koeficijentom $\sqrt{2}$ na mjestima gdje je $n=0$ i $n=N-1$.

$x(n) = \{1, 2, 0, -2, 1\} \rightarrow y(n) = \{-2, 0, 2, 1, 2, 0, -2, 1\}$

$$DCT\text{-}1\left[x(n)\right] = X(k) = \sqrt{\frac{2-\delta(k)-\delta(k-4)}{4}} \sum_{n=0}^{4} x(n) \cdot \frac{1}{\sqrt{1+\delta(k)+\delta(n-4)}} \cos\frac{nk\pi}{4}$$

$$= \left\{\frac{\sqrt{2}}{2}, 2, 1, -2, \frac{\sqrt{2}}{2}\right\}$$

$$y(n) \xrightarrow{0} z(n) = \{\sqrt{2}, 2, 0, -2, \sqrt{2}, -2, 0, 2\}$$

$$DFT_8\left[z(n)\right] = Z(k) = \sum_{n=0}^{7} z(n) W_8^{nk} = \sqrt{2} W_8^{0} + 2 W_8^{k} - 2 W_8^{3k} + \sqrt{2} W_8^{4k} - 2 W_8^{5k} + 2 W_8^{7k} =$$

$$= \sqrt{2} + 2 \cdot 2\cos\left(2\pi \frac{k}{8}\right) - 2 \cdot 2\cos\left(2\pi \frac{3k}{8}\right) + \sqrt{2} \cdot e^{-j2\pi\frac{4k}{8}}$$

$$= \sqrt{2} + 4\cos\left(\frac{k\pi}{4}\right) - 4\cos\left(\frac{3k\pi}{4}\right) + \sqrt{2} \cdot (-1)^k$$

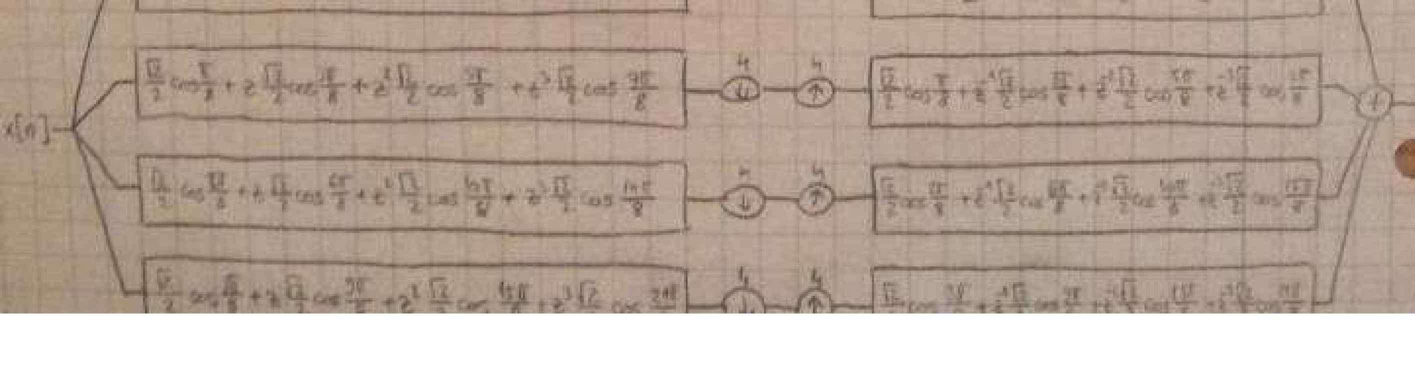
$$= \{2\sqrt{2}, 4\sqrt{2}, 2\sqrt{2}, -4\sqrt{2}, 2\sqrt{2}\}$$

	DCT		DFT		
$k=0$	$\frac{\sqrt{2}}{2}$	$=$	$\frac{1}{2} \cdot 2\sqrt{2} \cdot \sqrt{\frac{2-1}{4}}$	$= \frac{\sqrt{2}}{2}$	✓
$k=1$	2	$=$	$\frac{1}{2} \cdot 4\sqrt{2} \cdot \sqrt{\frac{2}{4}}$	$= 2$	✓
$k=2$	1	$=$	$\frac{1}{2} \cdot 2\sqrt{2} \cdot \sqrt{\frac{2}{4}}$	$= 1$	✓
$k=3$	-2	$=$	$\frac{1}{2} \cdot (-4\sqrt{2}) \cdot \sqrt{\frac{2}{4}}$	$= -2$	✓
$k=4$	$\frac{\sqrt{2}}{2}$	$=$	$\frac{1}{2} \cdot 2\sqrt{2} \cdot \sqrt{\frac{2-1}{4}}$	$= \frac{\sqrt{2}}{2}$	✓

4

$$C_4 = \begin{bmatrix} \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ \frac{\sqrt{2}}{2}\cos\frac{\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{3\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{5\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{7\pi}{8} \\ \frac{\sqrt{2}}{2}\cos\frac{2\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{6\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{10\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{14\pi}{8} \\ \frac{\sqrt{2}}{2}\cos\frac{3\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{9\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{15\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{21\pi}{8} \end{bmatrix} \qquad C_4^{-1} = \begin{bmatrix} \frac{1}{2} & \frac{\sqrt{2}}{2}\cos\frac{\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{2\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{3\pi}{8} \\ \frac{1}{2} & \frac{\sqrt{2}}{2}\cos\frac{3\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{6\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{9\pi}{8} \\ \frac{1}{2} & \frac{\sqrt{2}}{2}\cos\frac{5\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{10\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{15\pi}{8} \\ \frac{1}{2} & \frac{\sqrt{2}}{2}\cos\frac{7\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{14\pi}{8} & \frac{\sqrt{2}}{2}\cos\frac{21\pi}{8} \end{bmatrix}$$

Elementi retka matrice C_4 su koeficijenti prijenosne funkcije nekauzalnog filtra.
Elementi stupca matrice C_4^{-1} su koeficijenti prijenosne funkcije kauzalnog filtra.



(5)

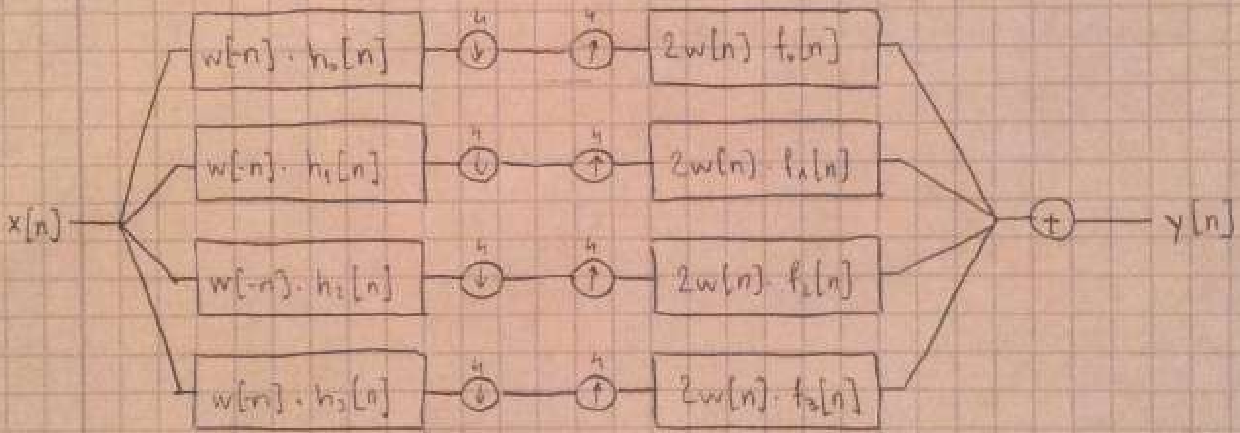
$$M_4 = \begin{bmatrix} \cos\frac{5\pi}{16} & \cos\frac{7\pi}{16} & \cos\frac{9\pi}{16} & \cos\frac{11\pi}{16} & \cos\frac{13\pi}{16} & \cos\frac{15\pi}{16} & \cos\frac{17\pi}{16} & \cos\frac{19\pi}{16} \\ \cos\frac{15\pi}{16} & \cos\frac{21\pi}{16} & \cos\frac{27\pi}{16} & \cos\frac{33\pi}{16} & \cos\frac{39\pi}{16} & \cos\frac{45\pi}{16} & \cos\frac{51\pi}{16} & \cos\frac{57\pi}{16} \\ \cos\frac{25\pi}{16} & \cos\frac{35\pi}{16} & \cos\frac{45\pi}{16} & \cos\frac{55\pi}{16} & \cos\frac{65\pi}{16} & \cos\frac{75\pi}{16} & \cos\frac{85\pi}{16} & \cos\frac{95\pi}{16} \\ \cos\frac{45\pi}{16} & \cos\frac{63\pi}{16} & \cos\frac{81\pi}{16} & \cos\frac{99\pi}{16} & \cos\frac{117\pi}{16} & \cos\frac{135\pi}{16} & \cos\frac{153\pi}{16} & \cos\frac{171\pi}{16} \end{bmatrix}$$

$$M_4^{-1} = \frac{1}{4}\begin{bmatrix} \cos\frac{5\pi}{16} & \cos\frac{15\pi}{16} & \cos\frac{25\pi}{16} & \cos\frac{45\pi}{16} \\ \cos\frac{7\pi}{16} & \cos\frac{21\pi}{16} & \cos\frac{35\pi}{16} & \cos\frac{63\pi}{16} \\ \cos\frac{9\pi}{16} & \cos\frac{27\pi}{16} & \cos\frac{45\pi}{16} & \cos\frac{81\pi}{16} \\ \cos\frac{11\pi}{16} & \cos\frac{33\pi}{16} & \cos\frac{55\pi}{16} & \cos\frac{99\pi}{16} \\ \cos\frac{13\pi}{16} & \cos\frac{39\pi}{16} & \cos\frac{65\pi}{16} & \cos\frac{117\pi}{16} \\ \cos\frac{15\pi}{16} & \cos\frac{45\pi}{16} & \cos\frac{75\pi}{16} & \cos\frac{135\pi}{16} \\ \cos\frac{17\pi}{16} & \cos\frac{51\pi}{16} & \cos\frac{85\pi}{16} & \cos\frac{153\pi}{16} \\ \cos\frac{19\pi}{16} & \cos\frac{57\pi}{16} & \cos\frac{95\pi}{16} & \cos\frac{171\pi}{16} \end{bmatrix}$$

$$w[n] = \left\{ \underline{\sin\frac{\pi}{16}}, \sin\frac{3\pi}{16}, \sin\frac{5\pi}{16}, \sin\frac{7\pi}{16}, \sin\frac{9\pi}{16}, \sin\frac{11\pi}{16}, \sin\frac{13\pi}{16}, \sin\frac{15\pi}{16} \right\}$$

$$w[-n] = \left\{ \sin\frac{15\pi}{16}, \sin\frac{13\pi}{16}, \sin\frac{11\pi}{16}, \sin\frac{9\pi}{16}, \sin\frac{7\pi}{16}, \sin\frac{5\pi}{16}, \sin\frac{3\pi}{16}, \underline{\sin\frac{\pi}{16}} \right\}$$

Vremenski otvor je prikladan te zadovoljava Princen-Bradleyeve uvjete: simetričan je te vrijedi $w^2[n] + w^2[n+N] = 1$.



$$H_0(z) = \sin\frac{\pi}{16}\cos\frac{5\pi}{16} + z^{-1}\sin\frac{3\pi}{16}\cos\frac{7\pi}{16} + z^{-2}\sin\frac{5\pi}{16}\cos\frac{9\pi}{16} + z^{-3}\sin\frac{7\pi}{16}\cos\frac{11\pi}{16} + z^{-4}\sin\frac{9\pi}{16}\cos\frac{13\pi}{16} + z^{-5}\sin\frac{11\pi}{16}\cos\frac{15\pi}{16} + z^{-6}\sin\frac{13\pi}{16}\cos\frac{17\pi}{16} + z^{-7}\sin\frac{15\pi}{16}\cos\frac{19\pi}{16}$$

$$H_1(z) = \sin\frac{\pi}{16}\cos\frac{15\pi}{16} + z^{-1}\sin\frac{3\pi}{16}\cos\frac{21\pi}{16} + z^{-2}\sin\frac{5\pi}{16}\cos\frac{27\pi}{16} + z^{-3}\sin\frac{7\pi}{16}\cos\frac{33\pi}{16} + z^{-4}\sin\frac{9\pi}{16}\cos\frac{39\pi}{16} + z^{-5}\sin\frac{11\pi}{16}\cos\frac{45\pi}{16} + z^{-6}\sin\frac{13\pi}{16}\cos\frac{51\pi}{16} + z^{-7}\sin\frac{15\pi}{16}\cos\frac{57\pi}{16}$$

$$H_2(z) = \sin\frac{\pi}{16}\cos\frac{25\pi}{16} + z^{-1}\sin\frac{3\pi}{16}\cos\frac{35\pi}{16} + z^{-2}\sin\frac{5\pi}{16}\cos\frac{45\pi}{16} + z^{-3}\sin\frac{7\pi}{16}\cos\frac{55\pi}{16} + z^{-4}\sin\frac{9\pi}{16}\cos\frac{65\pi}{16} + z^{-5}\sin\frac{11\pi}{16}\cos\frac{75\pi}{16} + z^{-6}\sin\frac{13\pi}{16}\cos\frac{85\pi}{16} + z^{-7}\sin\frac{15\pi}{16}\cos\frac{95\pi}{16}$$

$$H_3(z) = \sin\frac{\pi}{16}\cos\frac{45\pi}{16} + z^{-1}\sin\frac{3\pi}{16}\cos\frac{63\pi}{16} + z^{-2}\sin\frac{5\pi}{16}\cos\frac{81\pi}{16} + z^{-3}\sin\frac{7\pi}{16}\cos\frac{99\pi}{16} + z^{-4}\sin\frac{9\pi}{16}\cos\frac{117\pi}{16} + z^{-5}\sin\frac{11\pi}{16}\cos\frac{135\pi}{16} + z^{-6}\sin\frac{13\pi}{16}\cos\frac{153\pi}{16} + z^{-7}\sin\frac{15\pi}{16}\cos\frac{171\pi}{16}$$

$$F_0(z) = \frac{1}{2}\sin\frac{\pi}{16}\cos\frac{5\pi}{16} + \frac{z^{-1}}{2}\sin\frac{3\pi}{16}\cos\frac{7\pi}{16} + \frac{z^{-2}}{2}\sin\frac{5\pi}{16}\cos\frac{9\pi}{16} + \frac{z^{-3}}{2}\sin\frac{7\pi}{16}\cos\frac{11\pi}{16} + \frac{z^{-4}}{2}\sin\frac{9\pi}{16}\cos\frac{13\pi}{16} + \frac{z^{-5}}{2}\sin\frac{11\pi}{16}\cos\frac{15\pi}{16} + \frac{z^{-6}}{2}\sin\frac{13\pi}{16}\cos\frac{17\pi}{16} + \frac{z^{-7}}{2}\sin\frac{15\pi}{16}\cos\frac{19\pi}{16}$$

$$F_1(z) = \frac{1}{2}\sin\frac{\pi}{16}\cos\frac{15\pi}{16} + \frac{z^{-1}}{2}\sin\frac{3\pi}{16}\cos\frac{21\pi}{16} + \frac{z^{-2}}{2}\sin\frac{5\pi}{16}\cos\frac{27\pi}{16} + \frac{z^{-3}}{2}\sin\frac{7\pi}{16}\cos\frac{33\pi}{16} + \frac{z^{-4}}{2}\sin\frac{9\pi}{16}\cos\frac{39\pi}{16} + \frac{z^{-5}}{2}\sin\frac{11\pi}{16}\cos\frac{45\pi}{16} + \frac{z^{-6}}{2}\sin\frac{13\pi}{16}\cos\frac{51\pi}{16} + \frac{z^{-7}}{2}\sin\frac{15\pi}{16}\cos\frac{57\pi}{16}$$

$$F_2(z) = \frac{1}{2}\sin\frac{\pi}{16}\cos\frac{25\pi}{16} + \frac{z^{-1}}{2}\sin\frac{3\pi}{16}\cos\frac{35\pi}{16} + \frac{z^{-2}}{2}\sin\frac{5\pi}{16}\cos\frac{45\pi}{16} + \frac{z^{-3}}{2}\sin\frac{7\pi}{16}\cos\frac{55\pi}{16} + \frac{z^{-4}}{2}\sin\frac{9\pi}{16}\cos\frac{65\pi}{16} + \frac{z^{-5}}{2}\sin\frac{11\pi}{16}\cos\frac{75\pi}{16} + \frac{z^{-6}}{2}\sin\frac{13\pi}{16}\cos\frac{85\pi}{16} + \frac{z^{-7}}{2}\sin\frac{15\pi}{16}\cos\frac{95\pi}{16}$$

$$F_3(z) = \frac{1}{2}\sin\frac{\pi}{16}\cos\frac{45\pi}{16} + \frac{z^{-1}}{2}\sin\frac{3\pi}{16}\cos\frac{63\pi}{16} + \frac{z^{-2}}{2}\sin\frac{5\pi}{16}\cos\frac{81\pi}{16} + \frac{z^{-3}}{2}\sin\frac{7\pi}{16}\cos\frac{99\pi}{16} + \frac{z^{-4}}{2}\sin\frac{9\pi}{16}\cos\frac{117\pi}{16} + \frac{z^{-5}}{2}\sin\frac{11\pi}{16}\cos\frac{135\pi}{16} + \frac{z^{-6}}{2}\sin\frac{13\pi}{16}\cos\frac{153\pi}{16} + \frac{z^{-7}}{2}\sin\frac{15\pi}{16}\cos\frac{171\pi}{16}$$

(6) $x[n] = 5\delta[n] - 6\delta[n-2] + \delta[n-5] - \delta[n-7] \rightarrow x[n] = \{\underline{5}, 0, -6, 0, 0, 1, 0, -1\}$

$T_s = 1s$

$t_1 = 0{,}5s$

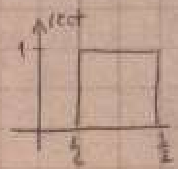
$$x_d(t) = \sum_{\ell=-\infty}^{\infty} x(\ell) \frac{\sin\left[\frac{\pi(t-\ell T)}{T}\right]}{\frac{\pi(t-\ell T)}{T}} = \sum_{\ell=-\infty}^{\infty} x(\ell)\,\mathrm{sinc}\left(\frac{t-\ell T}{T}\right)$$

$$x_d(t) = 5\,\mathrm{sinc}(t) - 6\,\mathrm{sinc}(t-2) + \mathrm{sinc}(t-5) - \mathrm{sinc}(t-7)$$

$$x_d(t_1) = x(0{,}5) = 5\,\mathrm{sinc}(0{,}5) - 6\,\mathrm{sinc}(-1{,}5) + \mathrm{sinc}(-4.5) - \mathrm{sinc}(-6.5) = \underline{\underline{4{,}4781}}$$

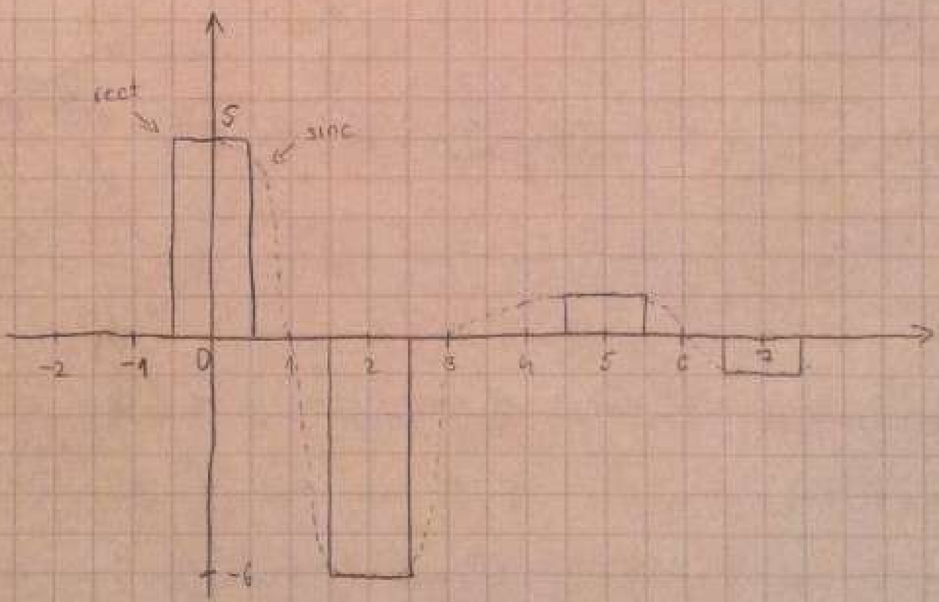
$$x_{FOH}(t) = \sum_{\ell=-\infty}^{\infty} x(\ell)\cdot \mathrm{tri}\left(\frac{t-\ell T}{T}\right) = 5\,\mathrm{tri}(t) - 6\,\mathrm{tri}(t-2) + \mathrm{tri}(t-5) - \mathrm{tri}(t-7)$$

$$x_{FOH}(t=0{,}5) = 5\,\underbrace{\mathrm{tri}(0{,}5)}_{0{,}5} - 6\,\mathrm{tri}(-1{,}5) + \mathrm{tri}(-4.5) - \mathrm{tri}(-6.5) = \underline{\underline{2{,}5}}$$



$$x_{ZOH}(t) = \sum_{\ell=-\infty}^{\infty} x(t)\cdot \mathrm{rect}\left(\frac{t-\ell T}{T}\right) = 5\,\mathrm{rect}(t) - 6\,\mathrm{rect}(t-2) + \mathrm{rect}(t-5) - \mathrm{rect}(t-7)$$

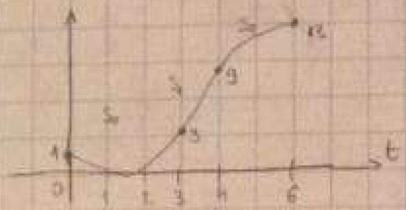
$$x_{ZOH}(t=0{,}5) = 5\,\underbrace{\mathrm{rect}(0{,}5)}_{1} - 6\,\mathrm{rect}(-1{,}5) + \mathrm{rect}(-4{,}5) - \mathrm{rect}(-6{,}5) = \underline{\underline{5}}$$



7.

t_i

$f(0)=1$
$f(3)=3$
$f(4)=9$
$f(6)=13$



$S'(3) = 5.2624$
$S''(3) = 4.5957$
$S_0(t) = ?$
$S_0(2) = ?$

$S_0(t) = a_0 + b_0(t-t_0) + c_0(t-t_0)^2 + d_0(t-t_0)^3$
$S_1(t) = a_1 + b_1(t-t_1) + c_1(t-t_1)^2 + d_1(t-t_1)^3$
$S_2(t) = a_2 + b_2(t-t_2) + c_2(t-t_2)^2 + d_2(t-t_2)^3$

SVOJSTVO INTERPOLACIJE: $S(t_i) = f(t_i)$, $S_{i-1}(t_i) = f(t_i)$

$S_0(0) = a_0 + b_0(0-0) + c_0(0-0)^2 + d_0(0-0)^3 = a_0 = 1$
$S_0(3) = a_0 + b_0(3-0) + c_0(3-0)^2 + d_0(3-0)^3 = a_0 + 3b_0 + 9c_0 + 27d_0 = 3$
$S_1(3) = a_1 + b_1(3-3) + b_1(3-3)^2 + d_1(3-3)^3 = a_1 = 3$
$S_1(4) = a_1 + b_1(4-3) + b_1(4-3)^2 + d_1(4-3)^3 = a_1 + b_1 + c_1 + d_1 = 3$
$S_2(4) = a_2 + b_2(4-4) + b_2(4-4)^2 + d_2(4-4)^3 = a_2 = 9$
$S_2(6) = a_2 + b_2(6-4) + b_2(6-4)^2 + d_2(6-4)^3 = a_2 + 2b_2 + 4b_2 + 8d_2 = 13$

NEPREKINUTOST DERIVACIJA: $S'_{i-1}(t_i) = S'_i(t_i)$, $S''_{i-1}(t_i) = S''_i(t_i)$

$S_0'(3) = b_0 + 2c_0(3-0) + 3d_0(3-0)^2 = b_0 + 6c_0 + 27d_0 = b_1 = S_1'(3)$
$S_1'(4) = b_1 + 2c_1(4-3) + 3d_1(4-3)^2 = b_1 + 2c_1 + 3d_1 = b_2 = S_2'(4)$

$S_0''(3) = 2c_0 + 6d_0(3-0) = 2c_0 + 18d_0 = 2c_1 = S_1''(3)$
$S_1''(4) = 2c_1 + 6d_1(4-3) = 2c_1 + 6d_1 = 2c_2 = S_2''(4)$

RUBNI UVJETI: $S''(t_0) = S''(t_{n+1}) = 0$

$S_0''(0) = c_0 = 0$
$S_2''(6) = 2c_2 + 6d_2(6-4) = 2c_2 + 12d_2 = 0$

$S_0(t) = ?$
$S_0(2) = ?$

$S_0(0) = a_0 = 1$
$S_0(3) = a_0 + 3b_0 + 9c_0 + 27d_0 = 3$
$S_0'(3) = b_0 + 6c_0 + 27d_0 = b_1 = 5{,}2624$
$S_0''(3) = 2c_0 + 18d_0 = 2c_1 = 4{,}5957$
$S_0''(0) = c_0 = 0$

$a_0 = 1$ $c_0 = 0$

$18d_0 = 4{,}5957$
$d_0 = 0{,}2553$

$b_0 = 5{,}2624 - 27d_0$
$b_0 = -1{,}6312$

$S_0(t) = 1 - 1{,}6312(t-0) + 0 \cdot (t-0)^2 + 0{,}2553(t-0)^3$

$S_0(t) = 1 - 1{,}6312t + 0{,}2553t^3$

$S_0(2) = -0{,}22$