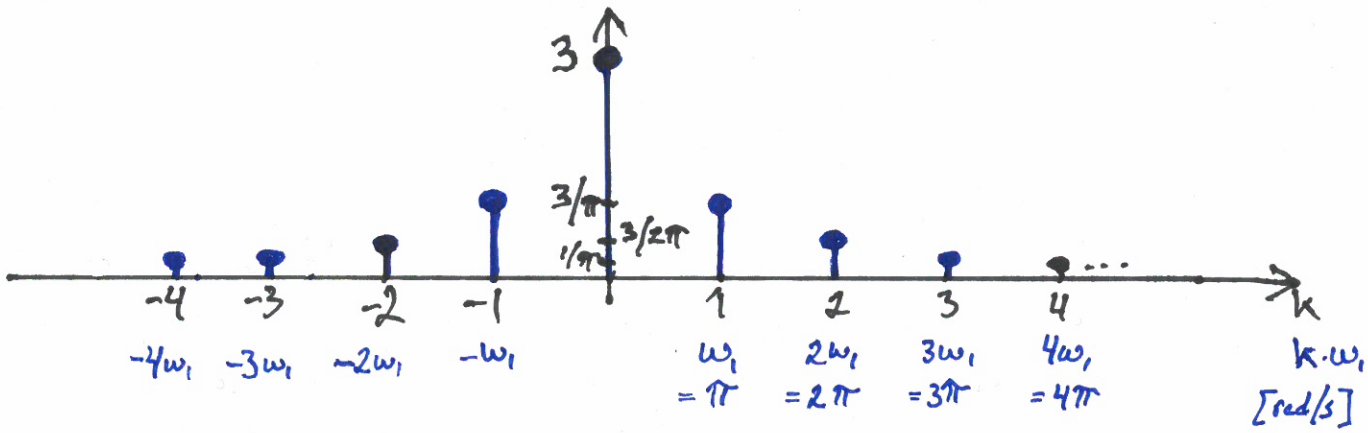
Exempel, dubbelsidigt spektrum (komplettera nedan själv!)

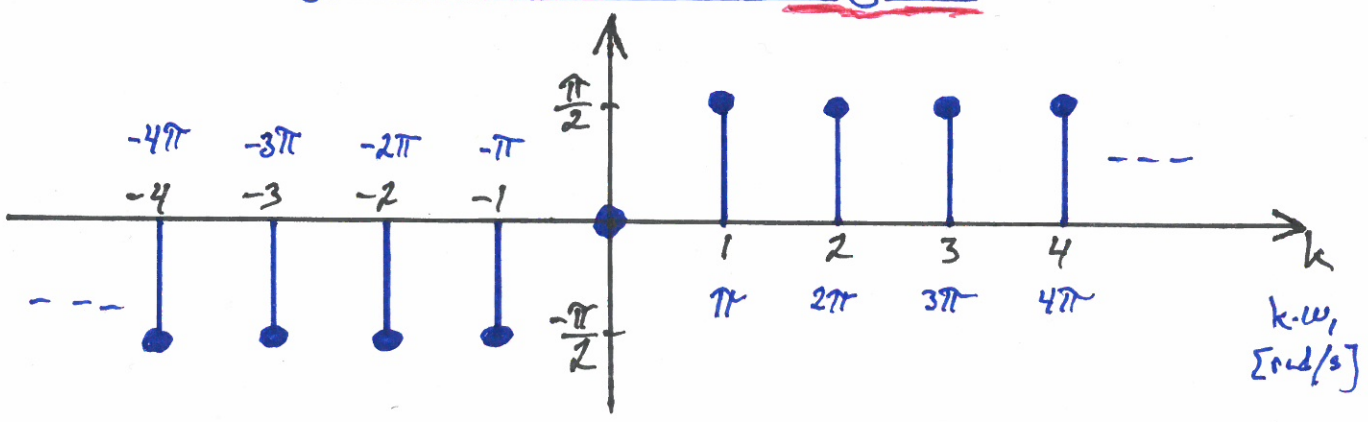
Samma $x(t)$ som vi tidigare ritat enkelsidigt spektrum för:

$$x(t) = 3 + \sum_{k=1}^{\infty} \frac{6}{k \cdot \pi} \sin(k\pi t + \pi)$$

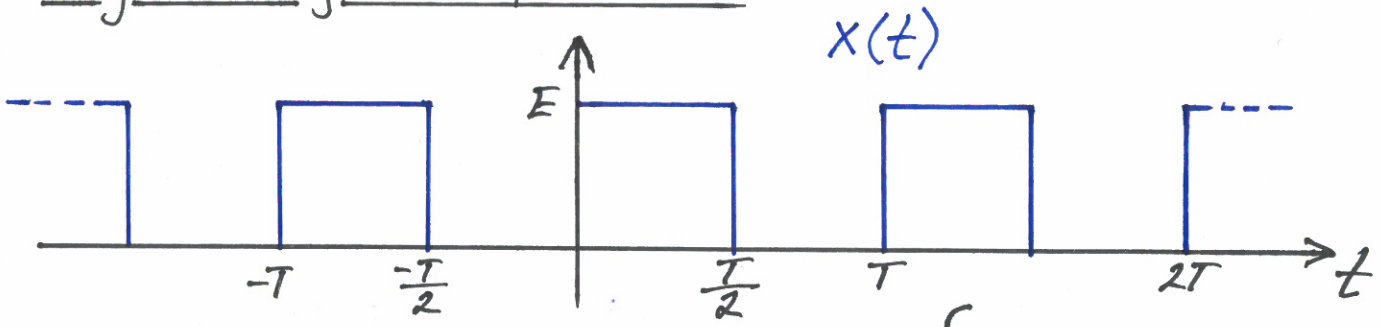
Dubbelsidigt amplitudspektrum $|C_k|$:



Dubbelsidigt fasspektrum $\arg C_k$:

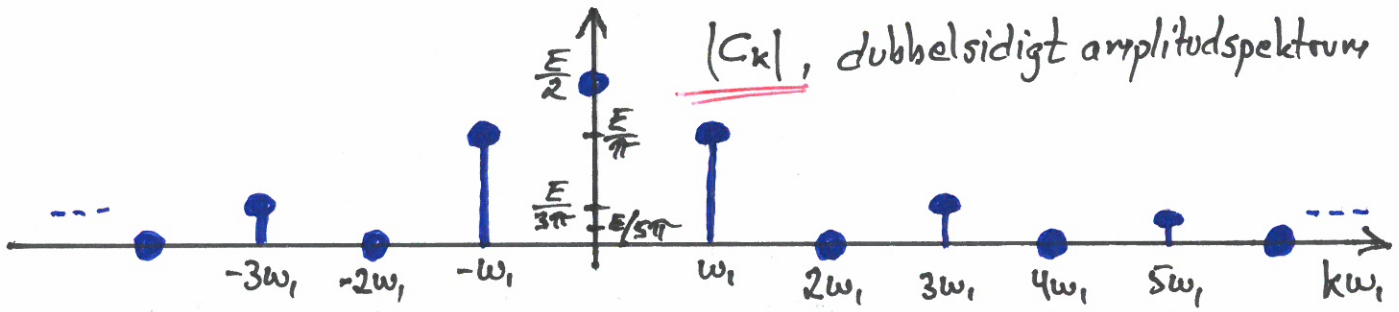


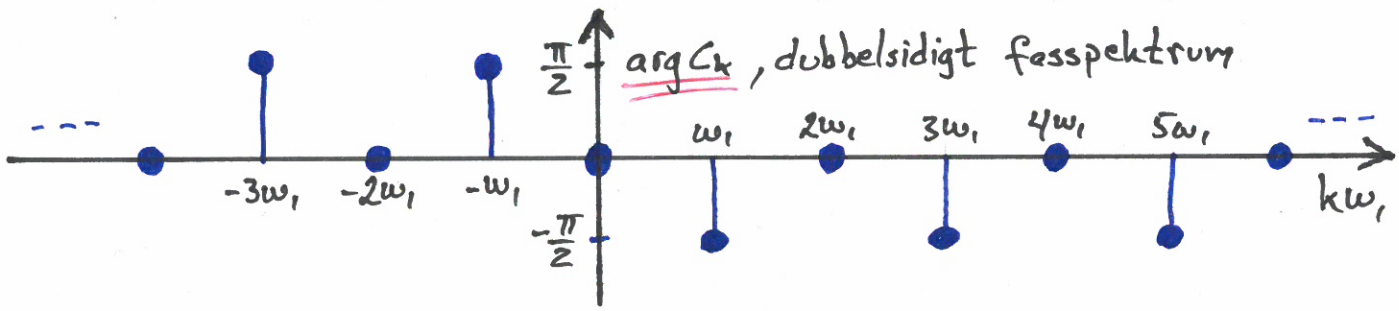
Fyrkantvågens spektrum



Tavlan: $C_k = \frac{1}{T}\int_T x(t)e^{-jk\omega_1 t}dt = \ldots = \begin{cases} \frac{E}{2}\,; & k=0 \\ 0\,; & \text{jämna } k\neq 0 \\ \frac{E}{jk\pi}\,; & \text{udda } k \end{cases}$

$$\Rightarrow \begin{cases} X_0 = \frac{E}{2} \\ \hat{X}_k = \frac{2E}{k\cdot\pi}\,;\ \text{udda } k>0,\ \hat{X}_k = 0;\ \text{jämna } k>0 \\ \varphi_k = 0\ ;\ k\geq 0 \end{cases}$$

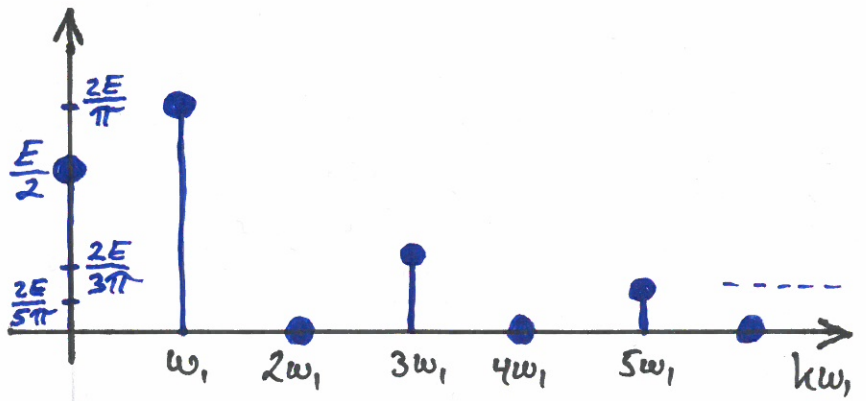




Enkelsidigt amplitudspektrum

$\hat{X}_0, \hat{X}_{k>0}$

$X_0 = C_0,\ \hat{X}_{k>0} = 2|C_k|$



Enkelsidigt fasspektrum ($k\geq 0$)

$\varphi_k = \arg C_k + \frac{\pi}{2}$

$(\varphi_k = 0 \text{ om } C_k = 0)$