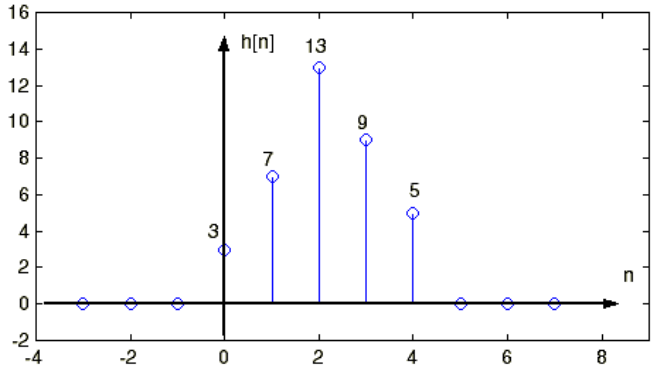
Opg 5.6

a) $$y[n]=\sum_{k=0}^{M} b_k x[n-k]$$

Input: $x[n]=\delta[n]$ $\Rightarrow$ output: $h[n]$.

$$y[n]=h[n]=\sum_{k=0}^{M} b_k \delta[n-k]=\begin{cases} b_n & n=0,1,...M \\ 0 & ellers \end{cases}$$ (p.129)

$M=4 \Rightarrow \{b_0,b_1,b_2,b_3,b_4\}=\underline{\{3,7,13,9,5\}}$



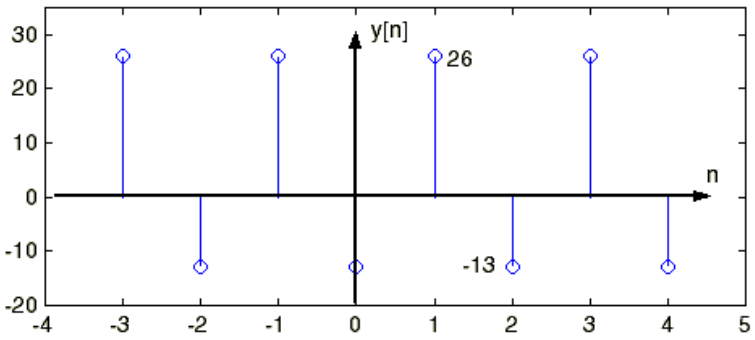
b) $\{b_k\}=\{13,-13,13\}$ svarende til $M=2$

$$y[n]=\sum_{k=0}^{2} b_k x[n-k]=13x[n]-13x[n-1]+13x[n-2]$$

Input: $x[n]=\begin{cases} 0 & n \ \ lige \\ 1 & n \ \ ulige \end{cases}$ for $-\infty < n < \infty$.

n	...	-3	-2	-1	0	1	2	3	...
x[n]	...	1	0	1	0	1	0	1	...
y[n]	...	26	-13	26	-13	26	-13	26	...

$\underline{y[n]=\begin{cases} -13 & n \ \ lige \\ 26 & n \ \ ulige \end{cases}}$ for



Man kan også skrive: $y[n] = \sum_{k=0}^{2} h[k]x[n-k] = x[n] * h[n].$

Foldning (convolution):

n	-2	-1	0	1	2	3	4	5
x[n]	0	1	0	1	0	1	0	1
h[n]	0	0	13	-13	13	0	0	0
h[0]x[n-0]	0	13	0	13	0	13	0	13
h[1]x[n-1]	-13	0	-13	0	-13	0	-13	0
h[2]x[n-2]	0	13	0	13	0	13	0	13
y[n]	-13	26	-13	26	-13	26	-13	26