

# FIR Filters and Convolution Example

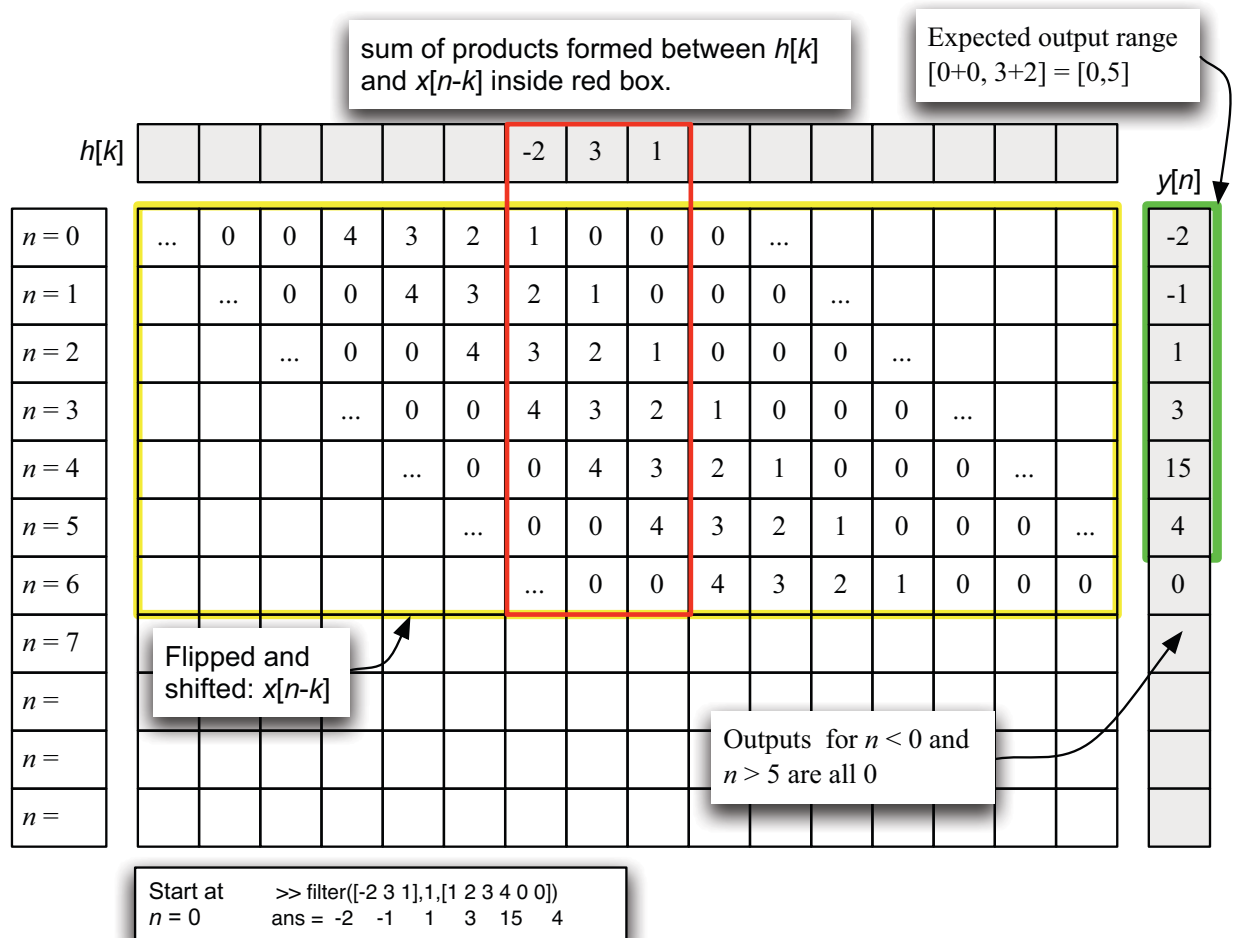
An FIR filter has impulse response

$$h[n] = -2\delta[n] + 3\delta[n - 1] + \delta[n - 2]$$

The input to the filter,  $x[n]$ , is

$$x[n] = \begin{cases} 4 - n, & 0 \leq n \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

- Find the filter output  $y[n]$



An FIR filter has impulse response

$$h[n] = \{1, 1, 2, 2\}$$

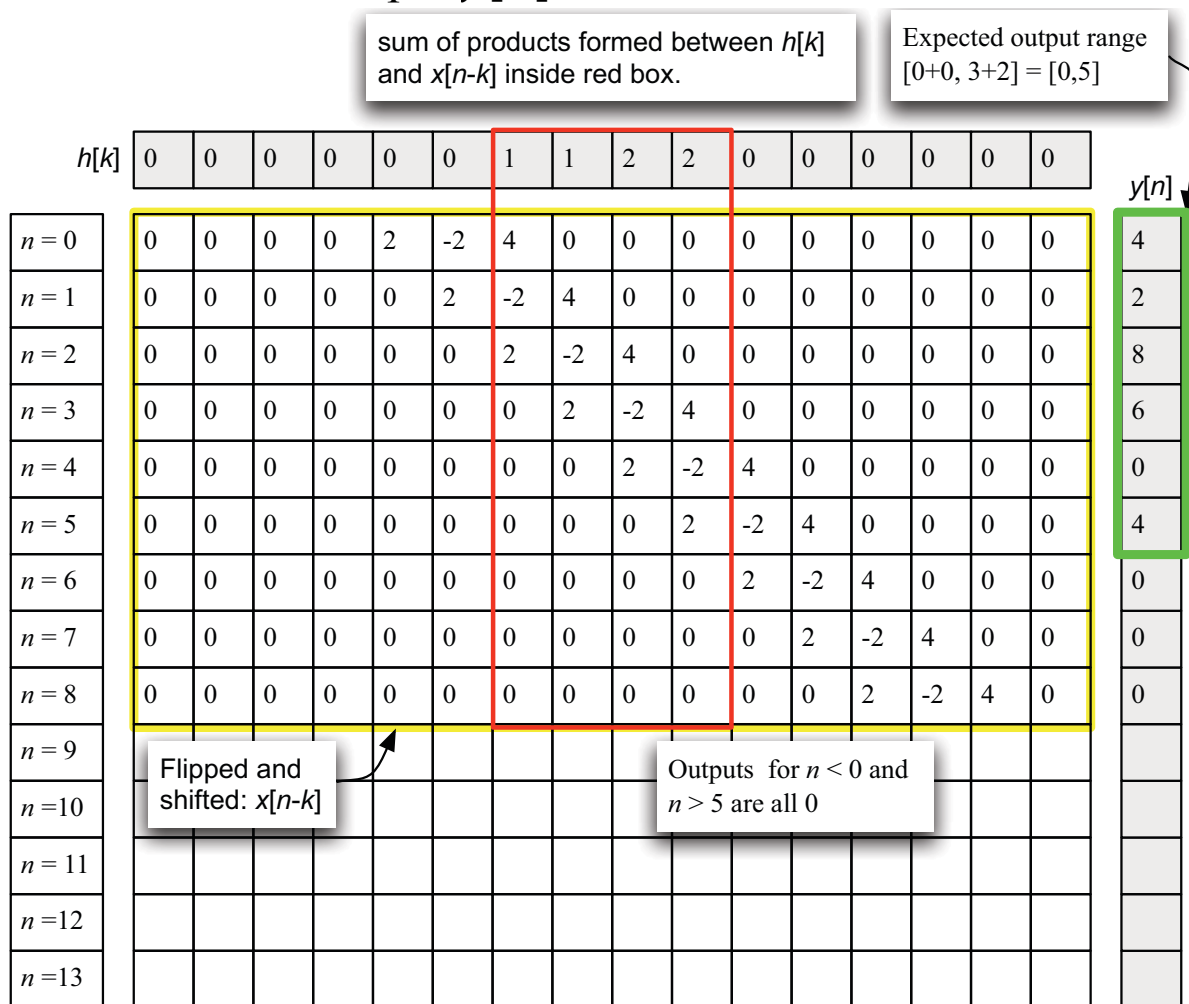
$\uparrow$   
 $n = 0$

The input to the filter is

$$x[n] = \{4, -2, 2\}$$

$\uparrow$   
 $n = 0$

- Find the filter output  $y[n]$



**MATLAB Check**

```
>> filter([1 1 2 2],1,[4 -2 2 0 0 0])
ans = 4 2 8 6 0 4 0
      n=0      n=5
```