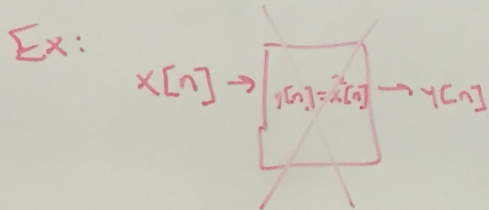


$$y[n] = \alpha x_1[n-n_1] + \beta x_2[n-n_2]$$

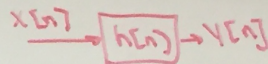
$$y[n] = \alpha y_1[n-n_1] + \beta y_2[n-n_2]$$

where  $x_1[n] \rightarrow y_1[n]$   
 $x_2[n] \rightarrow y_2[n]$



Not Linear

But Time Invariant



$$y[n] + a y[n-1] = b x[n]$$

If  $x[n] = [1 \ 0 \ 0 \ 0 \ 0]$

to get  $y[n] \Rightarrow$  convolution  
 need  $h[n]!$

Compute  $h[n]$  from  $x[n] = [1 \ 0 \ 0 \ \dots]$

| n | x(n) | y(n)              | y(n-1)            |
|---|------|-------------------|-------------------|
| 0 | 1    | b                 | 0                 |
| 1 | 0    | -ab               | b                 |
| 2 | 0    | -a <sup>2</sup> b | -ab               |
| 3 | 0    | -a <sup>3</sup> b | -a <sup>2</sup> b |
| ⋮ | 0    | ⋮                 | ⋮                 |

assume zero initial conditions

$$y(n) = -ay(n-1) + bx(n)$$

If stable:  $|a| < 1$