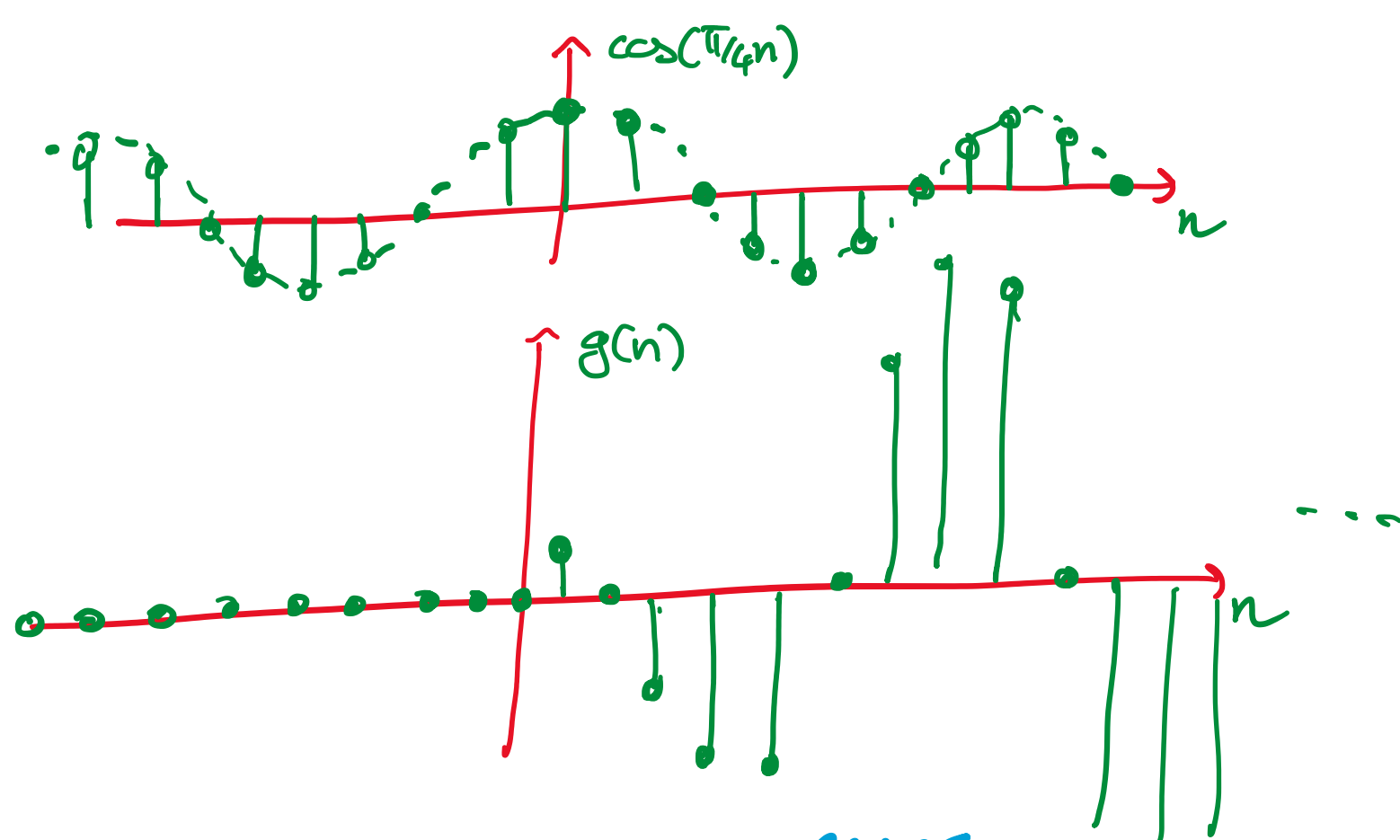


CAUSAL
REAL

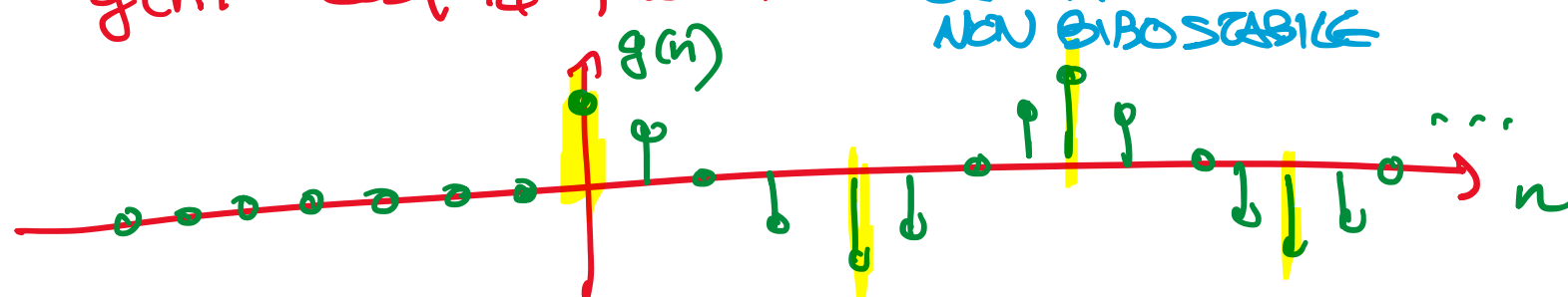
ES1 SISTEMA LTI CON $g(n) = n \cos(\pi/4 n) 1_0(n)$

E' BIBO STABLE? NO



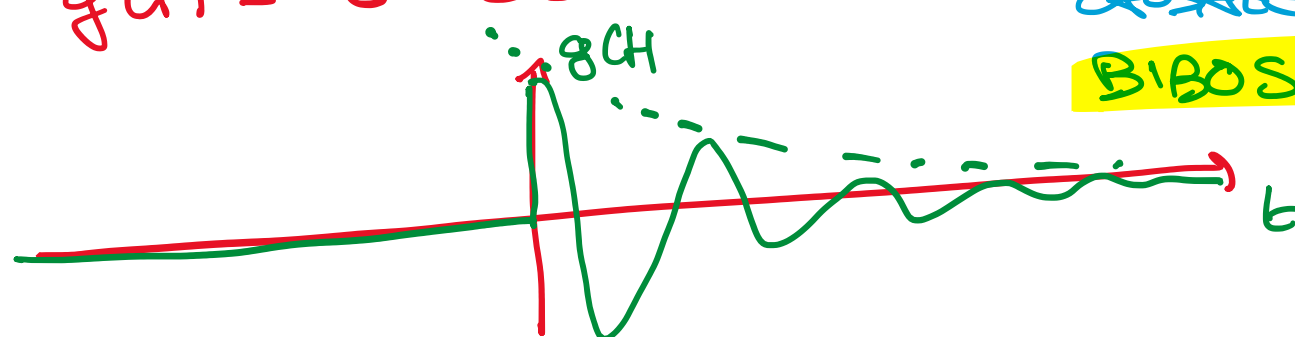
ES2 $g(n) = \cos(\pi/4 n) 1_0(n)$

CAUSAL
REAL
NON BIBO STABLE



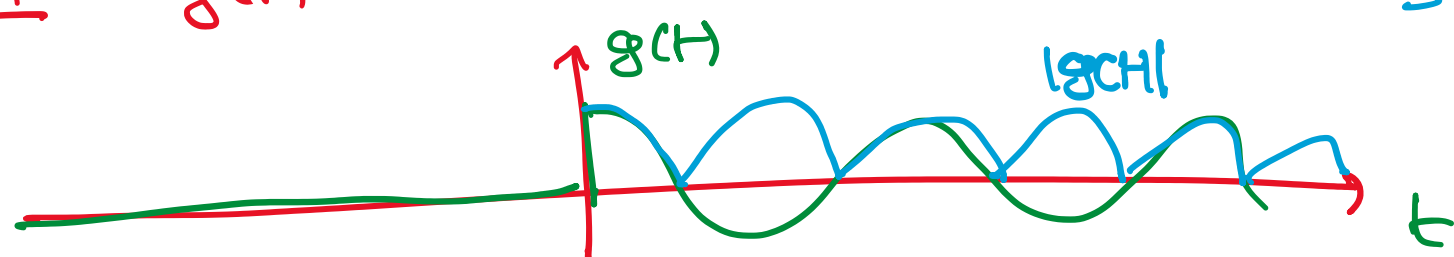
ES3 $g(t) = e^{-t} \cos(2t) 1(t)$

CAUSAL
REAL
BIBO STABLE

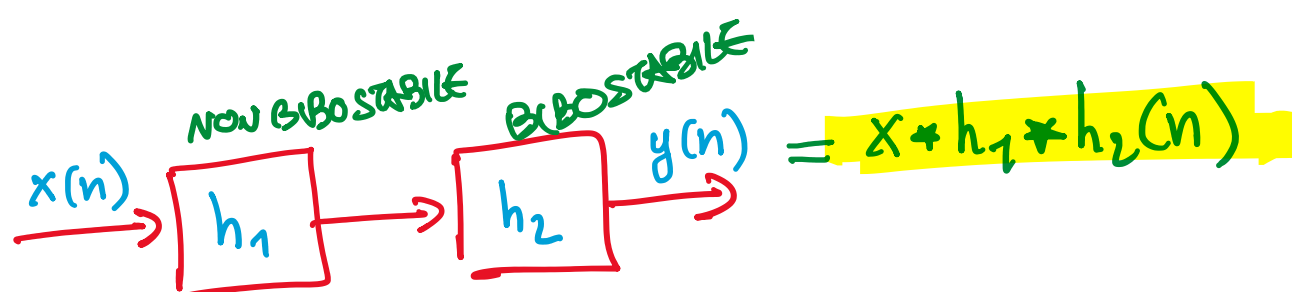


$$Lg = \int_{-\infty}^{+\infty} |g(t)| dt = \int_0^{+\infty} e^{-t} |\cos(2t)| dt \leq \int_0^{+\infty} e^{-t} dt = -e^{-t} \Big|_0^{+\infty} = 0 - (-1) = 1$$

ES4 $g(t) = \cos(2t) 1(t)$ → CAUSAL, REAL, NON BIBO STABLE



ES5



$$x(n) = \delta(n) - a \delta(n-1)$$

$$h_1(n) = \sin(\delta n)$$

$$h_2(n) = a^n 1_0(n), \quad |a| < 1$$

1) USCITA $y(n) = ?$

$$h = h_1 * h_2$$

2) SISTEMA COMPLESSIVO / BIBO STABLE?

$$L_1 = \sum_{n=-\infty}^{+\infty} |h_1(n)| = \infty$$

$$L_2 = \sum_{n=-\infty}^{+\infty} |h_2(n)| = \sum_{n=0}^{\infty} |a|^n = \frac{1}{1-|a|}$$

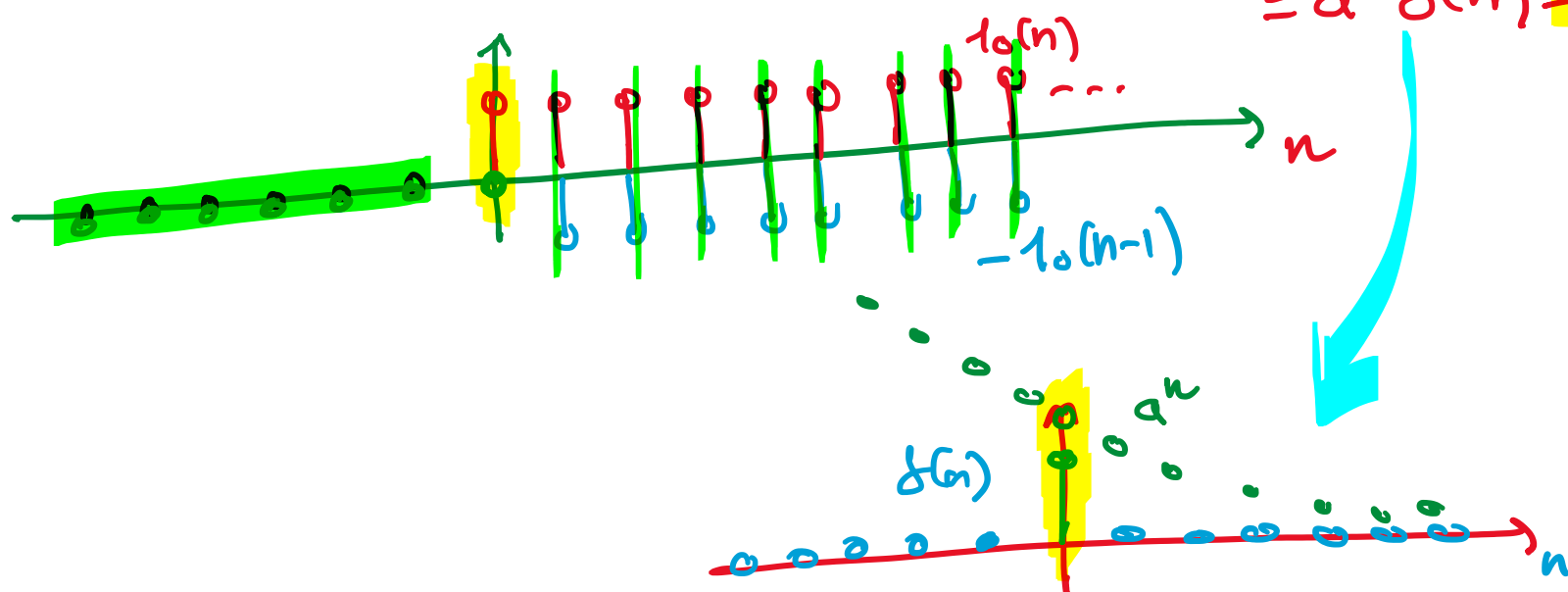
$$x * h_2(n) = [\delta(n) - a \delta(n-1)] * h_2(n)$$

$$= h_2(n) - a h_2(n-1)$$

$$= a^n 1_0(n) - a \cdot a^{n-1} 1_0(n-1)$$

$$= a^n (1_0(n) - 1_0(n-1)) = a^n \delta(n)$$

$$= a^0 \delta(n) = \delta(n)$$



$$y(n) = x * h_2 * h_1(n) = \delta * h_1(n) = h_1(n) = \sin(\delta n)$$