= The output of a LTI sys with special (classes of) input signals.

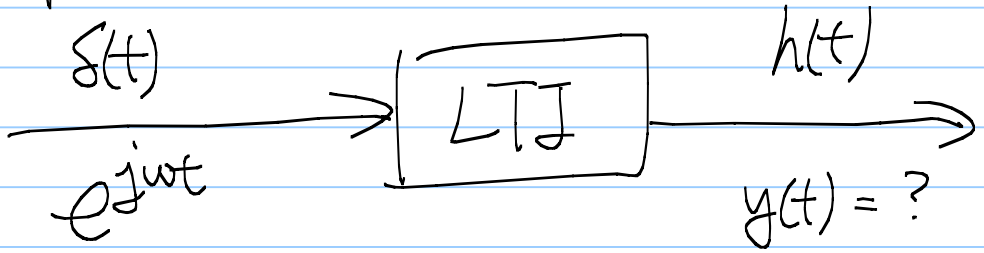
* When the input is a shifted impulse, the output is a [ ].

* What if the input is

CT

a complex exponential $e^{j\omega t}$ or $e^{j\omega n}$?

Q: For a given LTI system with impulse response $h(t)$



Find out the output $y(t)$.

Ans:

Example 1: when $h(t) = u(t) - u(t-1)$, Q: $H(j\omega) = ?$

Example 2: when $h(t) = e^{-t}u(t)$, Q: $H(j\omega) = ?$

☆ Note that $H(j\omega)$ may be a complex value, ex: $\frac{(-e^{j\omega}}{j\omega}$ or $\frac{1}{1+j\omega}$

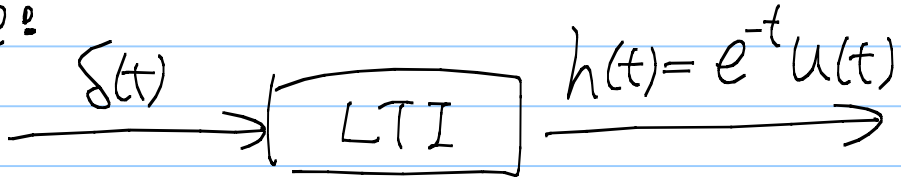
☆☆ For an LTI system, when the input is $x(t) = e^{j\omega t}$, the output is

$y(t) =$

$y(t)$ is of the same freq ω as $x(t)$

The only change is its [ ] (amplified by $H(j\omega)$) & its [ ] (shifted by $\measuredangle H(j\omega)$)

Example:



Q: Find out the output $y_1(t)$ when the input is $x_1(t) = \cos(t)$ (similar to F11, Final, Q5)

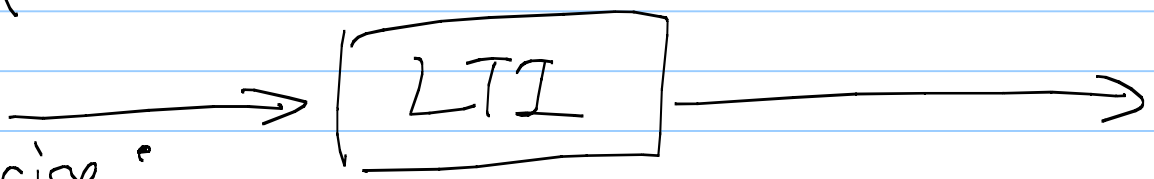
Ans: Let us solve a different problem first.

Q: Find out the output $y(t)$ when the input is $x(t) = e^{jwt}$.

Ans:

$\Rightarrow$ When the input is $\cos(t)$ $(Re(x(t)))$
the output is

$\frac{*}{*}$



Exercise:

Q: Find out the output $y_2(t)$
when the input is $x_2(t) = \cos(\sqrt{3}t)$

A:

* Watch Video 2.3.10