

## \* Generalized CTFT

Subject:  $x(t)$  can be periodic or aperiodic

Example:  $x(t) = \cos\left(\frac{2\pi}{3}t\right)$

Q: The F.S of  $x(t)$ .

Ans:

Q: Can we generalize CT FT so that

we can use CTFT to represent  $x(t)$  as well?

Ans:

By comparison,  $\neq$  we choose

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\* How to plot  $X(j\omega)$ ? A CT signal

\* For comparison: How to plot  $a_k$ ?

\* The above inspection method can be applied even to other complex exponentials.

Very similar to HW9 Q77

Example:  $x(t) = \cos(t) + \sin(\pi t)$

Q1: Is  $x(t)$  periodic?

Ans:

Q2: Find  $X(j\omega)$

Ans:

Q3: Plot  $X(j\omega)$ .

\* For general periodic  $x(t)$ , how to find its F.T.

Ans: Step 1: Find the CTFS of  $x(t)$

- ①  $\omega_0$
- ②  $a_k$

Step 2:

The FT kills two birds in one stone: Both  $\omega_0$  & the height.

\* Text Example 4.8

$$x(t) = \sum_{k=-\infty}^{\infty} \delta(t - kT) \quad \text{Plot } x(t)$$

Find  $X(j\omega) =$   , plot  $X(j\omega)$