⑤ Differentiation

$$x(t) \longleftrightarrow a_k,\ \omega_0$$

$$y(t) = \frac{d}{dt}x(t)$$

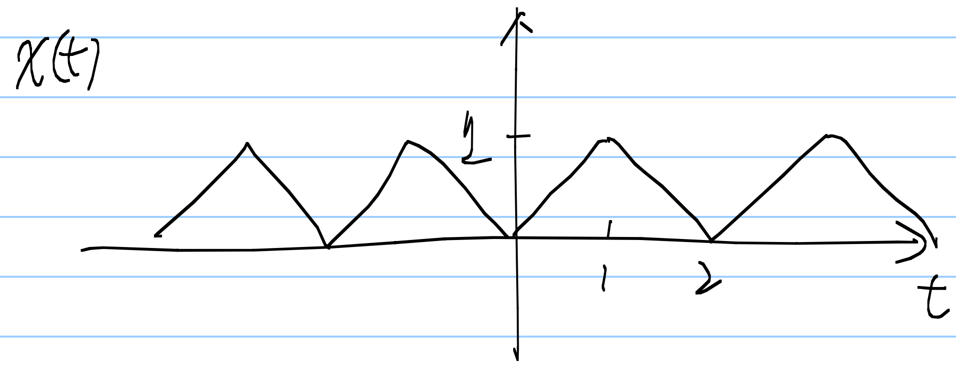
$$y(t) \longleftrightarrow b_k,\ \boxed{}$$

Find the F.S of $y(t)$

Ans:

by inspection

HW7Q63 Prob 3.24.



Q: F.S.

Ans:

Sub-Q: $y(t) = \frac{d}{dt}x(t)$, plot $y(t)$

Q: F.S ~~of~~ $y(t)$

Ans:

⑥ Multiplication

Suppose

$$x(t) \xleftrightarrow{F.S} a_k, \ \omega_0$$

$$y(t) \xleftrightarrow{F.S} b_k, \ \omega_0$$

} the same freq ω_0

$$z(t) = x(t) \cdot y(t) \xleftrightarrow{F.S} c_k, \ \boxed{}$$

Find the F.S. representation of $z(t)$.

Ans.

⑦ Parseval's Relationship

If

$x(t) \longleftrightarrow a_k, \omega_0$

then

Intuition, we first note that

Since $x(t) = \sum_{k=-\infty}^{\infty} a_k e^{jk\omega_0 t}$ contains many HRCEs, the avg power of $x(t)$ should be the sum of the avg powers of each HRCE.

* The Parseval's relationship is sometimes referred as the "power conservation law."