

CT periodic signals

Consider a CT $x(t)$ with period T .
 Its freq is $\omega_0 = \frac{2\pi}{T}$

Our goal is to write

This representation is called the
 representation

Q: Why called Fourier? Name after a French mathematician

Q: Why series? $\because x(t) = \sum_{k=-\infty}^{\infty} (\dots)$

Q: Why "representation"? $x(t)$ is equivalently expressed by the series

Other representation example:

Taylor's expansion: $\frac{1}{1-x} = 1 + x + x^2 + \dots$ for $|x| < 1$.

* The complex numbers a_0, a_{+1}, a_2, \dots
 $a_{-1}, a_2, - \dots$
are called the

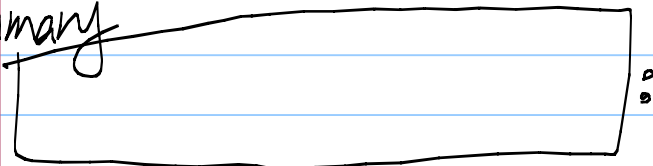
$X(t) =$

Q: How to compute a_k ?

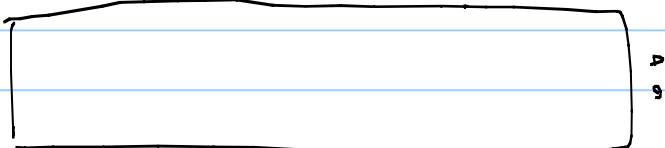
A:

* Derivation of the formula

Summary



Analysis of $x(t)$ by finding the coeff. of the harmonic components.



Synthesis of $x(t)$ from the weighted sum of the harmonic components.