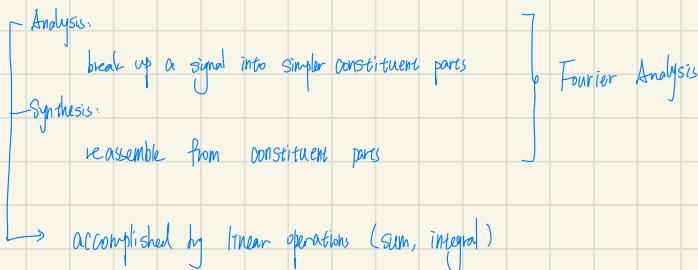




Fourier Series: identified with mathematical analysis of periodic phenomenon

Fourier Transform: "limiting case of F.S.". concerned with analysis of nonperiodic phenomenon



Periodic phenomenon & F.S.

periodic {
 in time (e.g. harmonic motion) → frequency
 in space some physical quantity distributed in region with symmetry.
 the region exhibits periodicity arises from the symmetry of the region (e.g. heated loop)
 Fourier analysis is often associated with symmetry
 → period Wavelength

$v = \lambda f$ for wave
reciprocal relationship
between spatial and frequency domains

$$\begin{aligned}\sin(t+2\pi) &= \sin t \\ \cos(t+2\pi) &= \cos t\end{aligned}$$

→ periodicity comes from the symmetry of the unit circle