

ECE 240 Formula Sheet

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Chapter 1

A continuous-time signal takes the form

$$x(t + nT) = x(t) \quad n \in \mathbb{Z}.$$

A signal $z(t) = \alpha x(t + aT_1) + \beta x(t + bT_2)$ will be periodic if

$$\frac{T_1}{T_2} = \frac{a}{b}$$

for some $a, b \in \mathbb{Z}$.

Let $x(t)$ be some signal.

- The energy for $t \in (-L, L)$ is given by

$$E_{2L} = \int_{-L}^L |x(t)|^2 dt,$$

- The total energy is given by

$$E = \lim_{T \rightarrow \infty} \int_{-L}^L |x(t)|^2 dt,$$

- The average power is given by

$$P = \lim_{T \rightarrow \infty} \frac{1}{2L} \int_{-L}^L |x(t)|^2 dt.$$

E finite \rightarrow **Energy signal** $\rightarrow P = 0$.

E infinite and P finite \rightarrow **Power signal**.

Periodic signal \rightarrow **Power signal**.