The sampling process or *ananlog-to-digital conversion* for the signal $x(t)$ produces the digitalized signal $x_d(t)$ is:

$$x_d(t) = R \left\lfloor \frac{x(t)}{R} \right\rfloor \qquad t = T, 2T, \ldots$$

We call R the resolution of the measurement and T the period.

Definition 1 (Stationary Conditions)**.** The assumption that a signal's stochastic basin mechanism does not change over time. Usually as a result of measurments of indepent random variables.

Definition 2 (Time average of signals)**.** For analog (time-continuous) signals:

$$AV_x = \lim_{T\to\infty} \frac{1}{T} \int_0^T x(t)\, dt$$

and for digital (discrete) signals:

$$AV_x = \frac{1}{N} \sum_{n=0}^{N-1} x(nT)$$

Definition 3 (Energy of a signal)**.** The energy of a signal:

$$EN_x = \int_0^\infty |x(t)|^2 dt, \quad \sum_{n=0}^{\infty} |x(nT)|^2 T$$

Definition 4 (Power of a signal)**.** For analog (time-continuous) signals:

$$AV_x = \lim_{T\to\infty} \frac{1}{T} \int_0^T |x(t)|^2 dt$$

and for digital (discrete) signals:

$$AV_x = \lim_{N\to\infty} \frac{1}{N} \sum_{n=0}^{N-1} |x(nT)|^2$$