For signals,

Energy and power can be denoted as the following:

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

$$P_\infty = \lim_{T\to\infty} \frac{1}{2T} \int_{-T}^{T} |x(t)|^2 dt$$

With x(t) being the signal. Note that power is derived from its definition, where power is the amount of work/energy over the time duration.

In this case, $E_\infty > 0$ due to the nature of signal being energy that is absorbed and not generated. In other words, signals are a passive energy that can be seen from the equation where the absolute of the original signal was taken into measure.

From this, $P_\infty \geq 0$ because by definition, power is the amount of energy absorbed over the time duration. Since a time duration could never be a negative value, therefore if E_∞ is a positive value, $P_\infty \geq 0$ where

1. $P_\infty = 0$ happens when E_∞ is a finite value,

$$P_\infty = \lim_{T\to\infty} \frac{1}{2T} \int_{-T}^{T} |x(t)|^2 dt$$

$$As\ T \to \infty, \left\{ \lim_{T\to\infty} \frac{1}{2T} \int_{-T}^{T} |x(t)|^2 dt \right\} \cong 0$$

2. $P_\infty > 0$ when $E_\infty = \infty$.

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