The Energy Density Spectrum

A useful parameter of a signal ( ) is its normalized energy. We define the normalized energy (or simply the energy) E of a signal () a the energy dissipated by a voltage ( ) applied across a 1-ohm resistor (or by a current ( ) passing through a 1-ohm resistror). Thus

$$= \int_{\infty}^{\infty} (\ )$$

There are varied definitions of the rise time

h . h response to rise from its zero value h (nearest to the minimum) to the reciprocal of the slope of ( ) $=.$ h $= 0.5/$ .In electronics circuits, the rise time is defined as the time required for the output to rise from 10% to 90% of its final value. In this is about 0.44/B. In all these definitions, it can be seen that is inversely proportional to the cutoff frequency.

The concept of signal energy is meaningful only if the integral . The signals for which the energy E is finite are known as energy signals (also known as pulse signals). With some signals,for example,periodic signals,the integral is obviously infinite and the concept of energy is meaningless. In such cases we consider the time average of the energy,which is obviously the average power of signal. Such signals are known as Power Signals and will be discussed later.

() h ( ),

$$(\ ) = -\int_{\infty}^{\infty} (\ )$$

And the energy E of ( )

$$= \int_{\infty}^{\infty} (\ ) \quad = \int_{\infty}^{\infty} (\ [) - \int_{\infty}^{\infty} (\ ) \quad]$$

Interchanging the order of integType equation here.ration on the right-hand side,we get

$$= \int_{\infty}^{\infty} (\ ) \quad = -\int_{\infty}^{\infty} (\ ) \int_{\infty}^{\infty} (\ )$$

and

$$\int_{\infty}^{\infty} \quad ( ) \qquad = \int_{\infty}^{\infty} | \quad (|$$

$$= \int_{\infty}^{\infty} | \quad (|$$

This equation* h h of a signal is given by the area under the | (| curve (integratewith respect to the frequency variable =—.