Visualization:

- Continuous-Time (CT)

Real	Complex
$x(t) =$	$x(t) =$
$x(\frac{1}{3}) =$	$x(\frac{1}{3}) =$
$x(\pi) =$	$x(\pi) =$

visualization

* Classification #2: By energy & by power

* Definition: Energy for CT signals

Energy between (t_1, t_2) interval is

For DT signals:

Energy between $[n_1, n_2]$ interval is

- Total Energy (between $(-\infty, \infty)$)

CT:

DT:

- Avg power between (t_1, t_2)

CT:

between $[n_1, n_2]$

DT:

(Overall) Avg. Power.

Note Title 8/26/2014

CT:

DT:

We can also define "instantenous power" by

or

Q: If the total energy is 3, what the overall avg power?

A:

Q: If the overall avg power is 3, what is the total energy?

A:

* Implication: We do not have finite energy, ∞ - power signals.

Q: $x(t) = \cos(t) + j\sin(t)$. What is the avg-power between $(-\frac{1}{2}, 1)$?

A:

* Let us briefly digress to the "algebra of signals"

* Signals are just functions. So given two signals x_1, x_2 (can be $x_1(t)$ $x_2(t)$ or $x_1[n]$, $x_2[n]$)

We can write,

New signals Old signals

- $y = x_1 + x_2$

  means $y(t) = x_1(t) + x_2(t)$ for all t.

- $y = \alpha x_1 \Rightarrow y[n] = \alpha x[n]$ for all n

- $y = x_1 \cdot x_2^2 \Rightarrow y(t) = (x_1(t)) \cdot (x_2(t))^2$

These operations are used/implemented quite often in a real system. Ex:

Ex:

Ex: