

Classification #4: Even & odd signals.

Even signals: let

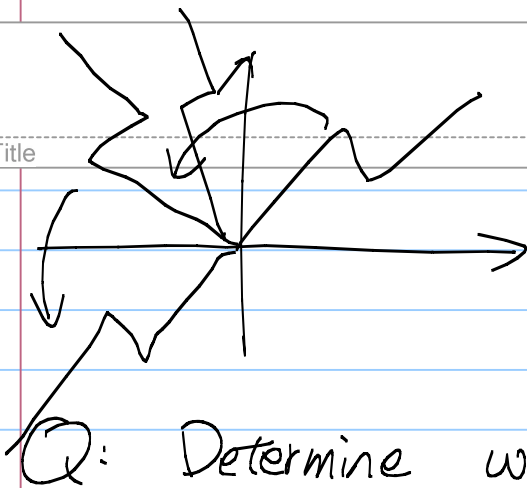
$x(t)$ & $y(t)$ look identical.

That is: signal for $t > 0$ and signal for $t < 0$ are mirror images of each other with $t=0$ axis serving as the mirror

Odd signals let

$x(t)$ & $y(t)$ look identical.

That is: Signal for $t < 0$ can be obtained by rotating the signal for $t > 0$ by 180 deg around the origin $(0,0)$ point.



Q: Determine whether the following signals

are even or odd or neither.

CT:

$$\cos(t)$$

$$\sin(t)$$

$$\cos\left(t + \frac{\pi}{4}\right)$$

$$\sin\left(t + \frac{\pi}{2}\right)$$

$$|t|$$

$$t^2$$

$$t^3$$

$$e^t$$

$$e^{t+1} \sin(t)$$

DT:

$x[n]$

$$\sin(\pi \times n)$$

$$(-1)^n$$

$$(-1)^{n+1}$$

* Any signal can be written as
a sum of an even signal & an odd
signal

$$X(t) = X_{\text{even}}(t) + X_{\text{odd}}(t).$$

HW > Q10

Q1
Ans:

Q2: Show that $x_1(t)$ is even
 $x_2(t)$ is odd.

Ans:

If we use even & odd signals as our test signal, then any new signal can be expressed as a sum of two test signals (one even, one odd).