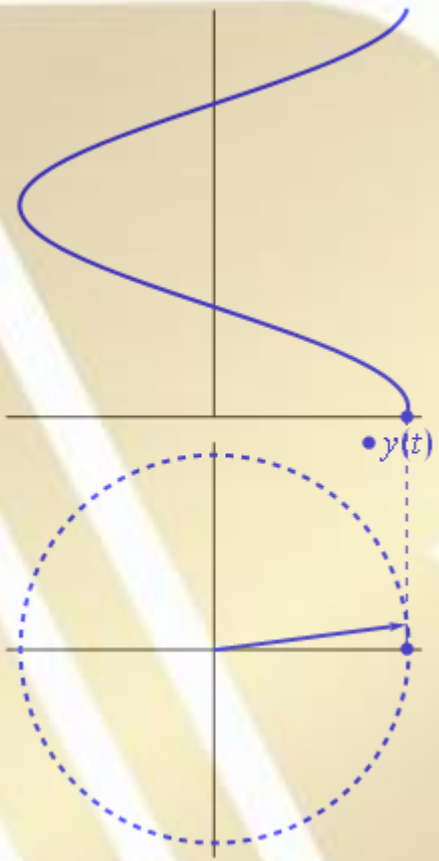

RF Components and Basic Concepts

1.15 - Phasor

Phasor

- Phasor is representation of sine wave with frequency and amplitude.
- We can represent a sine or cosine wave with a complex number.

$$x(t) = Acos(wt + \emptyset) = Re\left(Ae^{j\emptyset}\right)$$
$$A = |A|e^{jwt} = |A|(\cos(wt) + jsin(wt))$$

- For example $2cos\left(wt + 30^{\circ}\right)$ *can be shown as*
  - $2e^{j30^{\circ}}$ or $2 \angle 30^{\circ}$

Impedance and admittance

Element	Impedance	Admittance
R	$Z = R$	$Y = \frac{1}{R}$
L	$Z = j\omega L$	$Y = \frac{1}{j\omega L}$
C	$Z = \frac{1}{j\omega C}$	$Y = j\omega C$

Example


60 Ohm
R1
20cos(4t-15)
+
C1
10mF
L1
5 H
VoL
60 Ohm
R1
20 ∠-15
+
C1
-j25
L1
j20
VoL