Supplement: Phasor Math

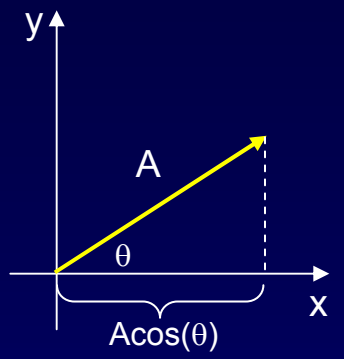
We want to manipulate $A\cos(\omega t+\phi)$. Use the fact that the x-component of a 2-dimensional vector is $A\cos(\theta)$.

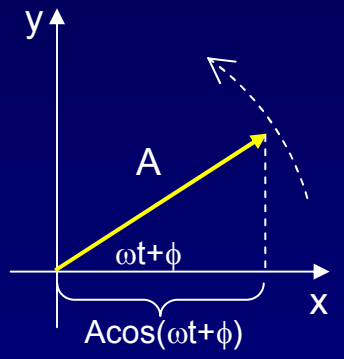
If θ is changing with time, $\theta = \omega t$, the vector is rotating, and the x component is $A\cos(\omega t+\phi)$. That's what we want.

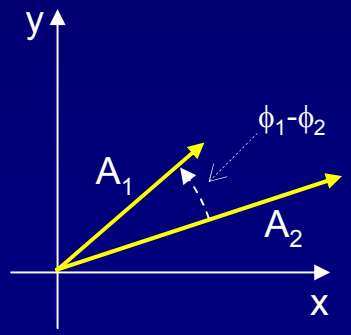
If we have two quantities that have the same frequency, but different amplitudes and phases:

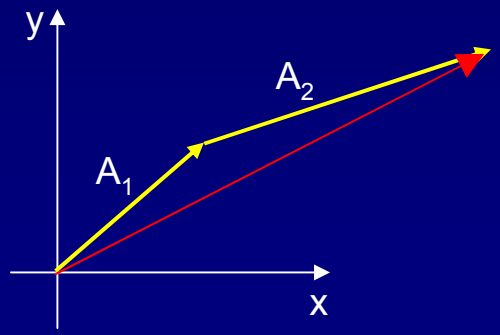
$A_1\cos(\omega t+\phi_1)$ and $A_2\cos(\omega t+\phi_2)$

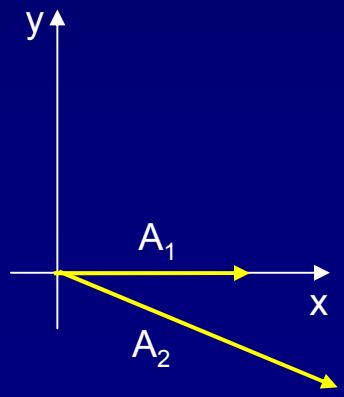
we can use vector addition to calculate their superposition.











It is conventional to draw one phasor horizontal. Because the phasors are rotating, this merely means we are looking at them at a particular time.