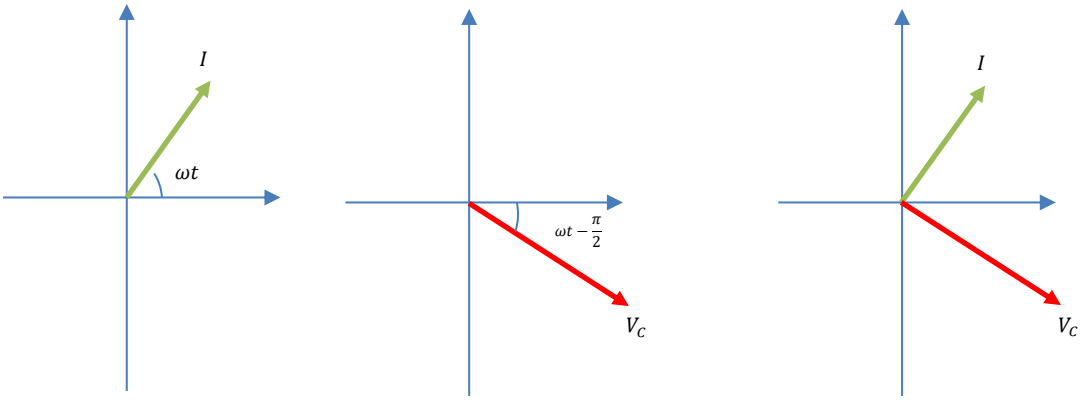
CONCEPT: PHASORS FOR CAPACITORS

- Remember! The voltage and current across a capacitor at any time *t* is
  - $i(t) = i_{MAX}\cos(\omega t)$
  - $v_c(t) = i_{MAX}\mathrm{X_C}\cos\left(\omega t - \frac{\pi}{2}\right)$
- Because both cosines have a DIFFERENT angle, they are said to be OUT OF PHASE – The voltage LAGS the current
  - This is reflected in their phasors:



- Voltage across a capacitor LAGS the current

EXAMPLE: An AC source is connected to a capacitor. At a particular instant in time, the voltage across the capacitor is positive and increasing in magnitude. Draw the phasors for voltage and current that correspond to this time.

PRACTICE: PHASORS IN A CAPACITOR CIRCUIT

An AC source operates at a maximum voltage of 60 V and is connected to a 0.7 mF capacitor. If the current across the capacitor is $i(t) = i_{MAX} \cos[(100\ s^{-1})t]$,

a) What is i_{MAX}?
b) Draw the phasors for voltage across the capacitor and current in the circuit at $t = 0.02\ s$. Assume that the current phasor begins at 0°.