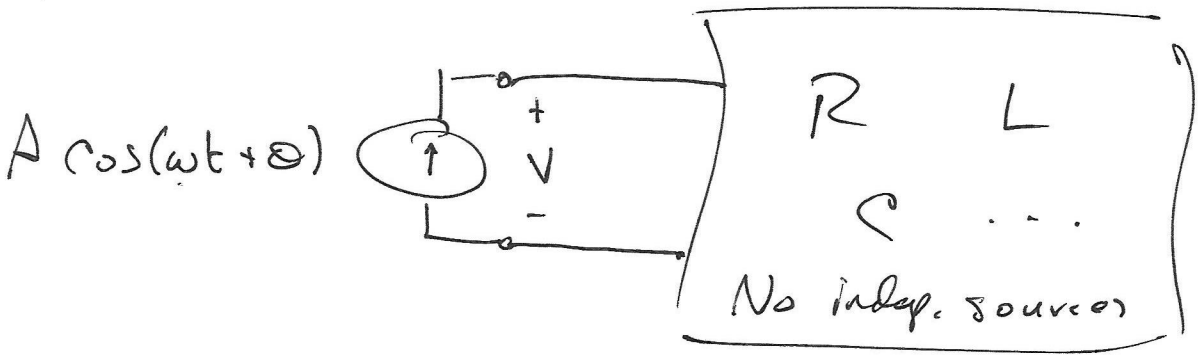
For DC steady-state analysis

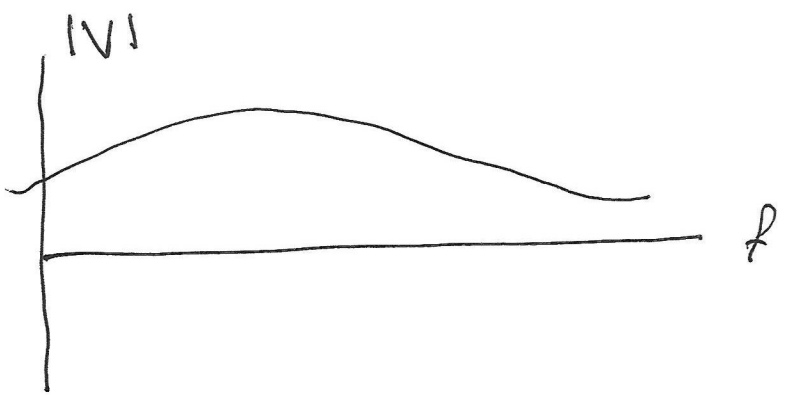
.OP

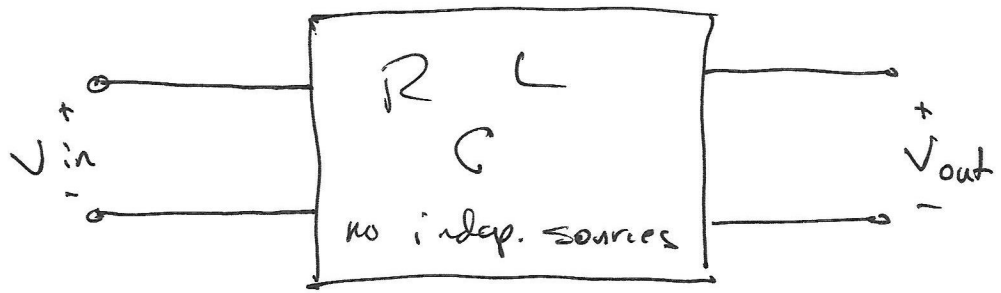
For AC steady-state analysis

.AC

Make a plot of magnitude and phase angle of a transfer function or impedance vs. frequency.

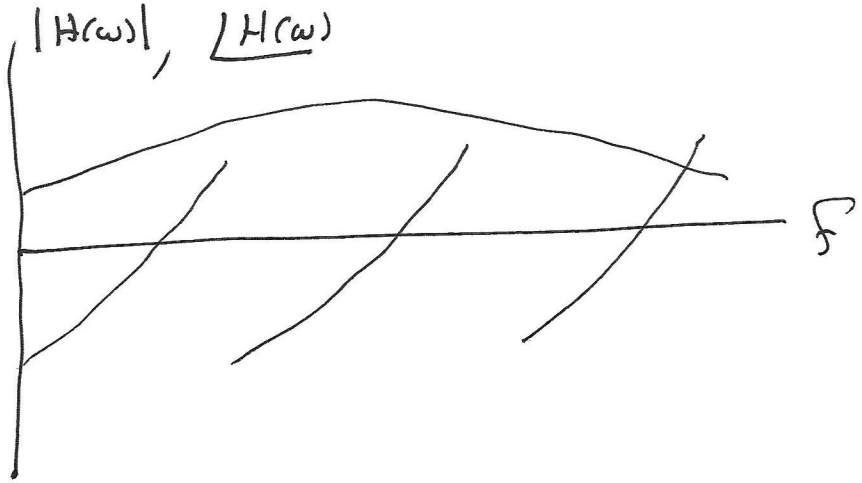


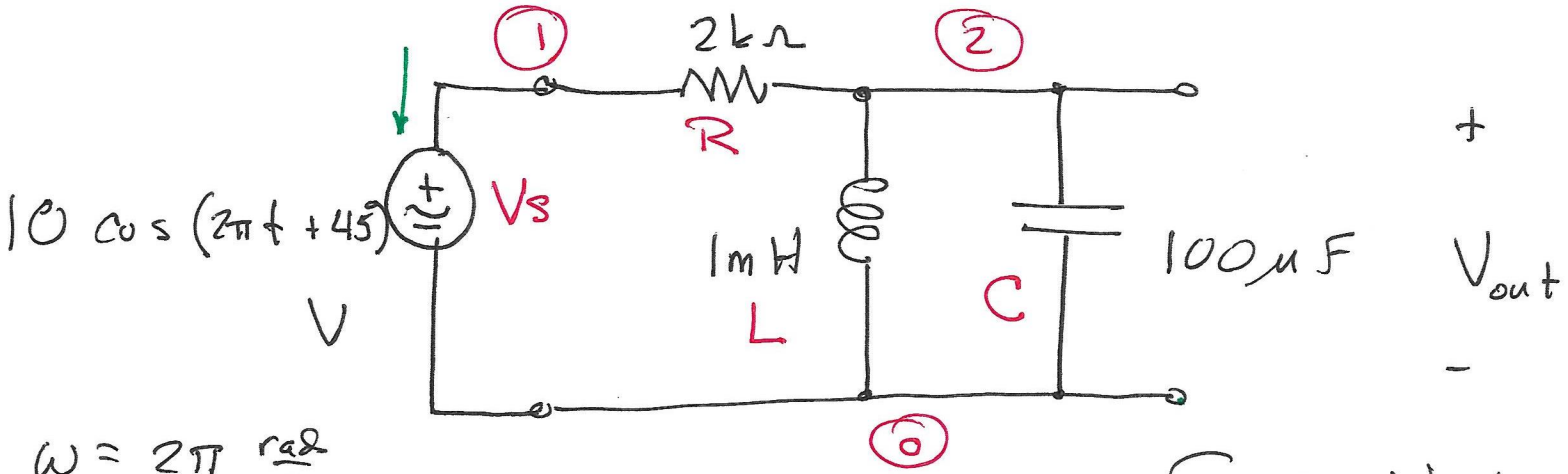




Define a transfer function

$$|H(\omega)| \triangleq \left| \frac{V_{out}}{V_{in}} \right|$$





$\omega = 2\pi \frac{rad}{s}$

$\theta = 45^\circ$ w.r.t. cosine

Find Vout.

Title Line

```
Vs   1   0   AC   10   45
R    1   2   2k
L    2   0   1m
C    2   0   100u
.AC  LIN  NP  fstart  fend
.end
```

Magnitude

phase angle in degrees not radians!

must be > 0

fend ≥ fstart

frequency in Hz

number of points
total for a linear scale
number of points per decade on a DEC scale
" " " " octave on an OCT scale

LIN => linear

DEC => decades

OCT => octaves

1 1 1 1 1
10 points are 100 evenly spaced

logarithmic w.r.t. base 10

logarithmic w.r.t. base 2

$$\omega = 2\pi = 2\pi f \Rightarrow f = 1 \text{ Hz}$$

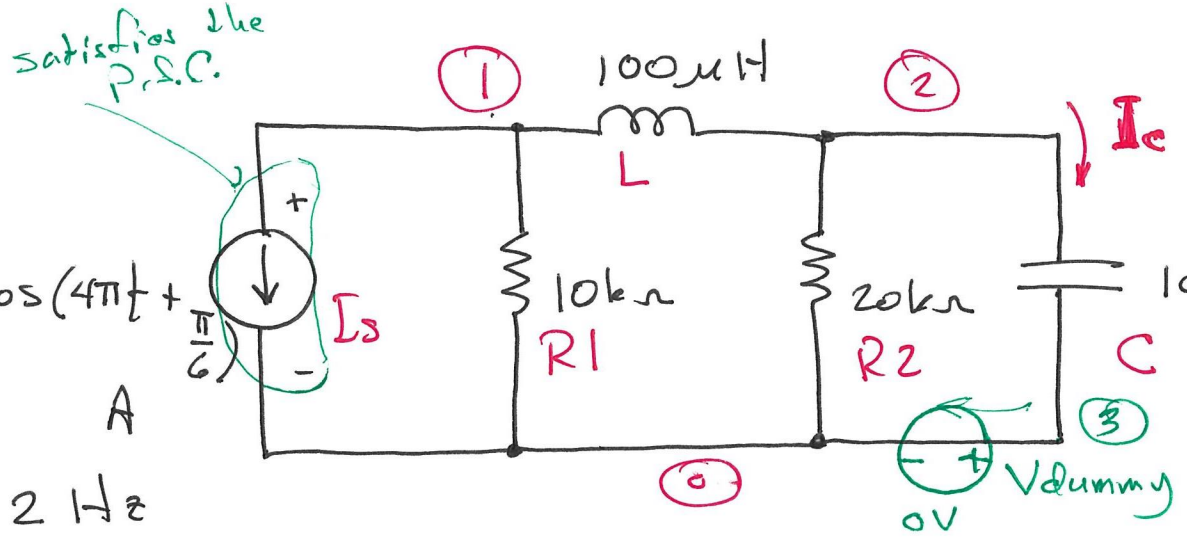
.AC LIN 1 1 1

Output table will contain

voltage magnitude
" phase angle
} for each node

current magnitude
" phase angle
} for each indep. voltage source

Remember: All components are assumed to satisfy the P.S.C.



$\omega = 4\pi$

$f = \frac{\omega}{2\pi} = 2$ Hz

Determine the current through the capacitor. (magnitude and phase angle)

Title

```
Is      1   0   AC   120   30
R1      1   0   10k
L       1   2   100u
R2      2   0   20k
C       2   3   10p
Vdummy  3   0   DC   0
.AC LIN 1   2   2
.end
```

Phase angle is always degrees