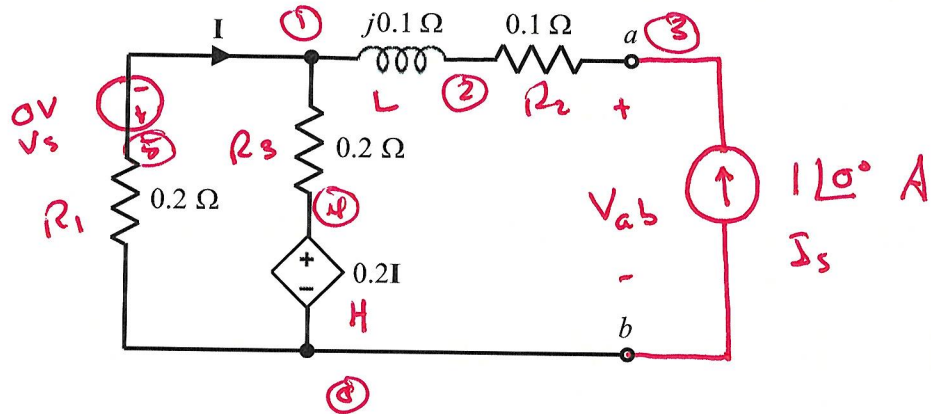


EE 3340
Homework Problem #047

The circuit shown is in the phasor domain. Determine its Thévenin equivalent at terminals (a,b).

Assume
 $\omega = 1 \text{ rad/s}$



No independent source $\Rightarrow V_T = 0 \text{ V}$

$Z_T = V_{ab} \Big|_{I_s = 1 \angle 0^\circ} = V_3$ in the circuit with current source shown above.

R1	5	0	0.2		
Vs	5	1	DC	0	
R3	1	4	0.2		
H	4	0	Vs	0.2	
L	1	2	0.1		
R2	2	3	0.1		
Is	0	3	AC	1	0
.AC	LIN	1	$\{1/(2\pi pi)\}$	$\{1/(2\pi pi)\}$	

```

LTSpice XVII - [Spring 2022 EE 3340 Homework Problem 047.cir]
File Edit View Simulate Tools Window Help
* Q:\Websites\RES\EE 3340\homework problems\Spring 2022 EE 3340 Homework Problem 047.cir
R1 5 0 0.2
Vs 5 1 DC 0
R3 1 4 0.2
H 4 0 Vs 0.2
L 1 2 0.1
R2 2 3 0.1
Is 0 3 AC 1 0
.AC LIN 1 {1/(2*pi)} {1/(2*pi)}
.end

```

```

* Q:\Websites\RES\EE 3340\homework problems\Spring 2022 EE 3340 Homework Problem 047.cir
--- AC Analysis ---

frequency:      0.159155      Hz
V(5):           mag: 0.0666667 phase: -1.09332e-015°      voltage
V(1):           mag: 0.0666667 phase: -1.09332e-015°      voltage
V(4):           mag: 0.0666667 phase: 180°                voltage
V(2):           mag: 0.120743 phase: 55.9151°             voltage
V(3):           mag: 0.195223 phase: 30.8128°             voltage
I(H):           mag: 0.666667 phase: -1.09332e-015°      device_current
I(L):           mag: 1 phase: 180°                       device_current
I(Is):          mag: 1 phase: 0°                         device_current
I(R2):          mag: 1 phase: 180°                       device_current
I(R3):          mag: 0.666667 phase: -1.09332e-015°      device_current
I(R1):          mag: 0.333333 phase: -1.09332e-015°      device_current
I(Vs):         mag: 0.333333 phase: 180°                 device_current

```

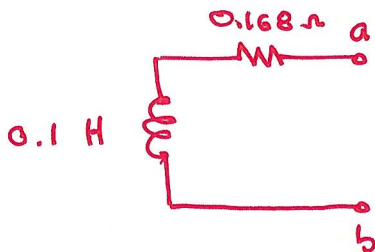
$$V_3 = 0.195223 \angle 30.8128^\circ$$

$\approx 0.168 + j 0.100 \Rightarrow$ a resistor in series with an inductor

$$R = 0.168 \Omega$$

$$j\omega L = j 0.100$$

$$\Rightarrow L = 0.1 \text{ H}$$



← Thévenin Equivalent