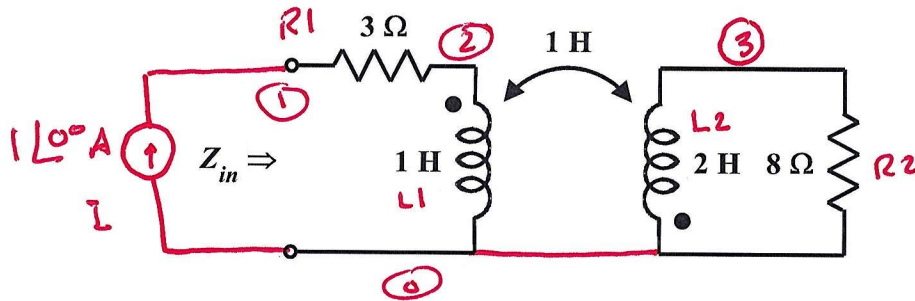


EE 3340
Homework Problem #032

Use LTspice to determine the input impedance of the circuit shown below in polar form at $\omega = 120\pi$ rad/s. Show your work.



$$k = \frac{1}{\sqrt{1.2}}$$

$$f = \frac{\omega}{2\pi} = 60\text{ Hz}$$

With a $1\angle 0^\circ$ A input, the voltage at node 1 will be the same as the input impedance.

See the following page for the LTspice solution.

```

LTspice XVII - [Spring 2022 EE 3340 Homework Problem 032.cir]
File Edit View Simulate Tools Window Help
* Q:\Websites\RES\EE 3340\homework problems\Spring 2022 EE 3340 Homework Problem 032.cir
I 0 1 AC 1 0
R1 1 2 3
L1 2 0 1
k L1 L2 {1/sqrt(1*2)}
L2 0 3 2
R2 3 0 8
.AC LIN 1 60 60
.end

```

--- AC Analysis ---

frequency:	60	Hz			
V(1):	mag:	188.583	phase:	88.4808°	voltage
V(2):	mag:	188.527	phase:	89.3922°	voltage
V(3):	mag:	3.99977	phase:	-179.392°	voltage
I(L2):	mag:	0.499972	phase:	-179.392°	device_current
I(L1):	mag:	1	phase:	0°	device_current
I(I):	mag:	1	phase:	0°	device_current
I(R2):	mag:	0.499972	phase:	-179.392°	device_current
I(R1):	mag:	1	phase:	0°	device_current

Handwritten notes: Z_{in} with arrows pointing to 188.583 and 88.4808°.

$$Z_{in} \approx 188.6 \angle 88.48^\circ \Omega$$