

EECS 622: Homework #12

October 9, 2025

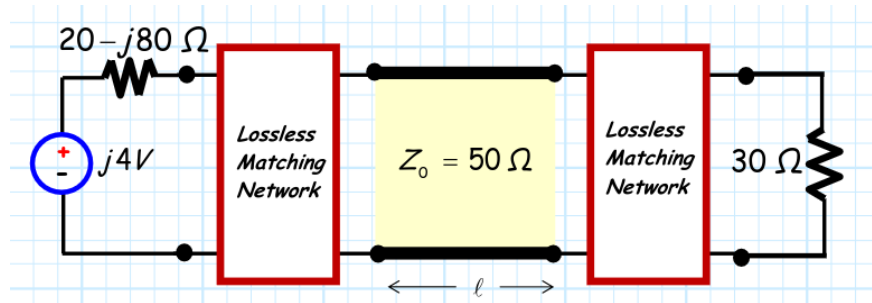
Grant Saggars

Problem 1

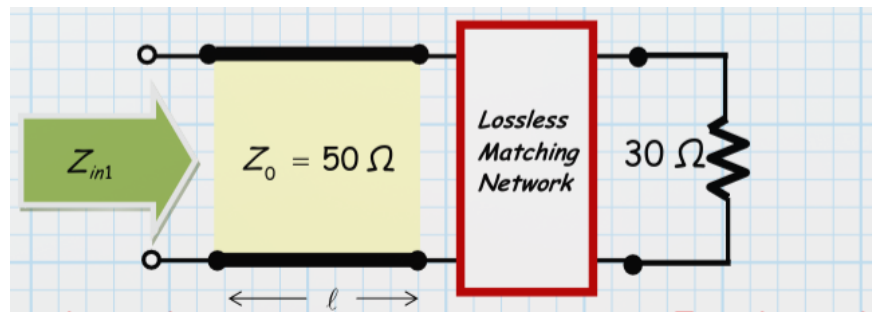
The two lossless matching networks in the circuit below were designed such that **maximum power transfer** is achieved—**regardless of length ℓ** of the transmission line!

In other words, line length ℓ can be changed **without affecting** this maximum power transfer.

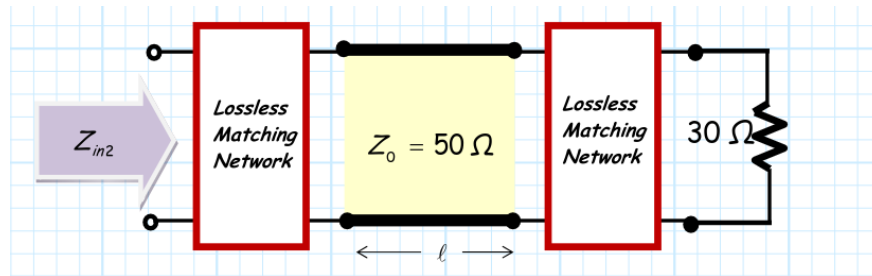
Hint: The answers to the following questions are **not** particularly difficult to determine. However, you must provide **detailed, explicit, and complete justification** for all your answers!



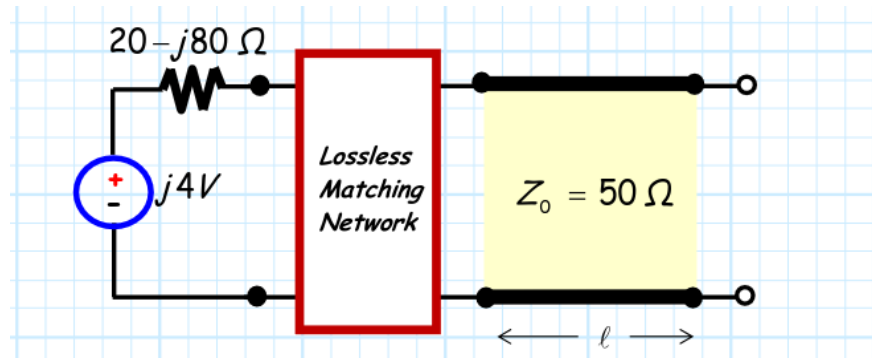
- A. Determine the **power absorbed** by the 30Ω load.
- B. Determine the **input impedance** Z_{in1} of this part of the circuit:



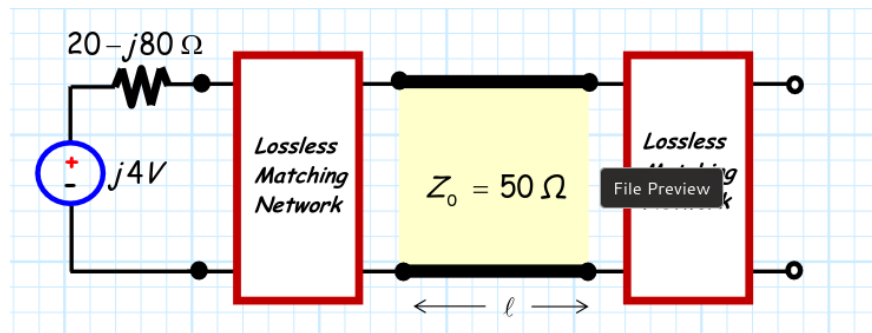
- C. Determine the **input impedance** Z_{in2} of this part of the circuit.



D. Determine the **output impedance** $Z_{\text{out}1}$ of the Thevenin's equivalent for this part of the circuit.



E. Determine the **output impedance** $Z_{\text{out}2}$ of the Thevenin's equivalent for this part of the circuit.

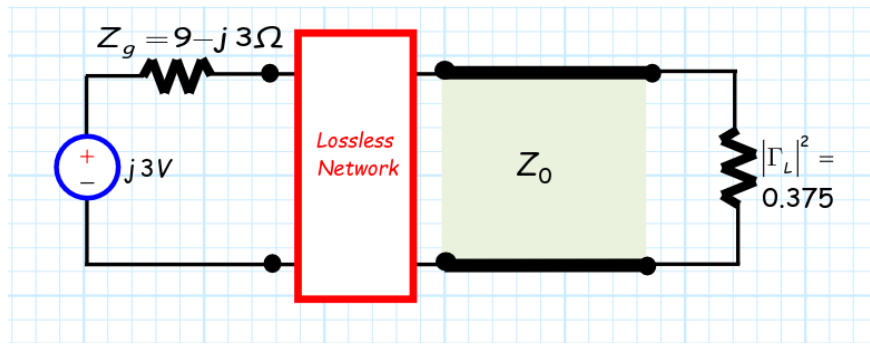


Problem 2

In the circuit below, the **source delivers** energy at a rate equal to its **available power**.

The **squared-magnitude of the load reflection coefficient** is

$$|\Gamma_L|^2 = 0.375.$$



Determine the power incident on the load Γ_L

Provide **explicit and detailed justification** for your answer.

Your grade will **primarily** depend on this justification.