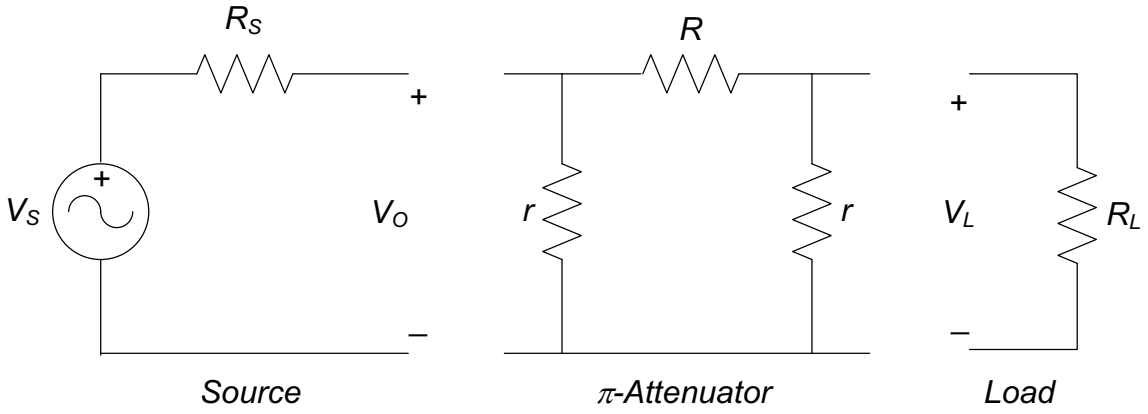
Engr228 Lab #4 – Pre-lab Assignment

DC Attenuator Design and Measurement

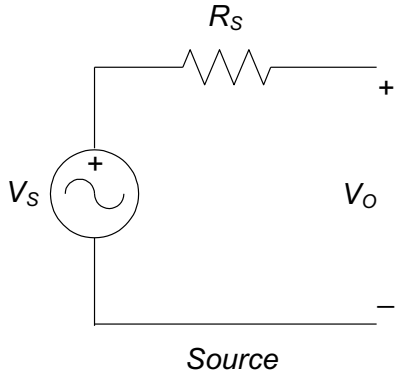
Name _____ **Grade _____/10**

Introduction

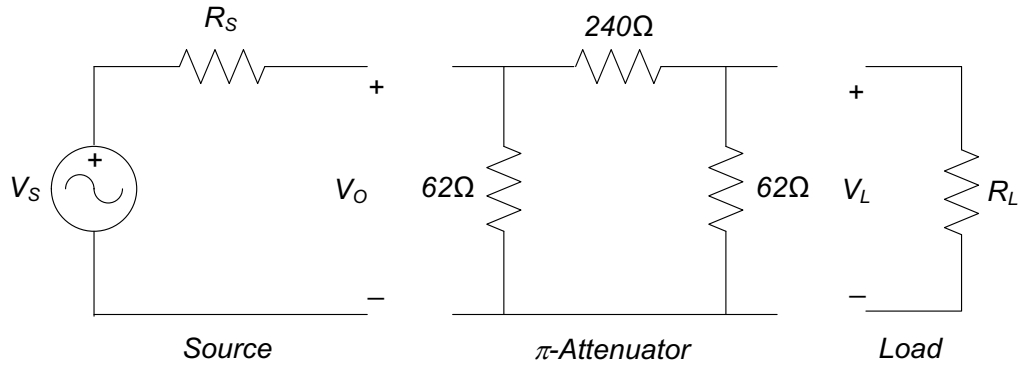
Attenuators are circuits that are commonly used in radio frequency (*RF*) applications to both reduce the level of the signal and to match the resistance of the source (R_S) to that of the load (R_L). One of the reasons that you want to match the source and load resistances is to eliminate standing waves on the transmission lines, thereby reducing distortion. Another reason is to transfer maximum power to the load. Shown below is a circuit called a π-attenuator whose name is derived from its visual architecture.



1) In the circuit at the right, V_S is an AC source with a value of $6.0V_{peak\text{-}to\text{-}peak}$ and $R_S = 50\ \Omega$. Place a load resistor R_L between the + and – terminals and fill in the table below for the indicated values of R_L. Note that this circuit behaves like a voltage divider for the AC source, just like it does for a DC source.



R_L	1000	500	200	100	80	60	50	40	30	20	10
$V_{O(calc)}$ (V)											



2) Using the values for the π-attenuator circuit shown above, calculate the equivalent resistance that the source sees (the resistance seen to the right of R_S) for load values of $R_L = 0\ \Omega$, $R_L = 50\ \Omega$, and $R_L = \infty\ \Omega$. You may draw your circuits on the right and below to aid your computations.

For $R_L = 0\ \Omega$

$R_{in,\ calculated}$ = _____ Ω

For $R_L = 50\ \Omega$

$R_{in,\ calculated}$ = _____ Ω

For $R_L = \infty\ \Omega$

$R_{in,\ calculated}$ = _____ Ω