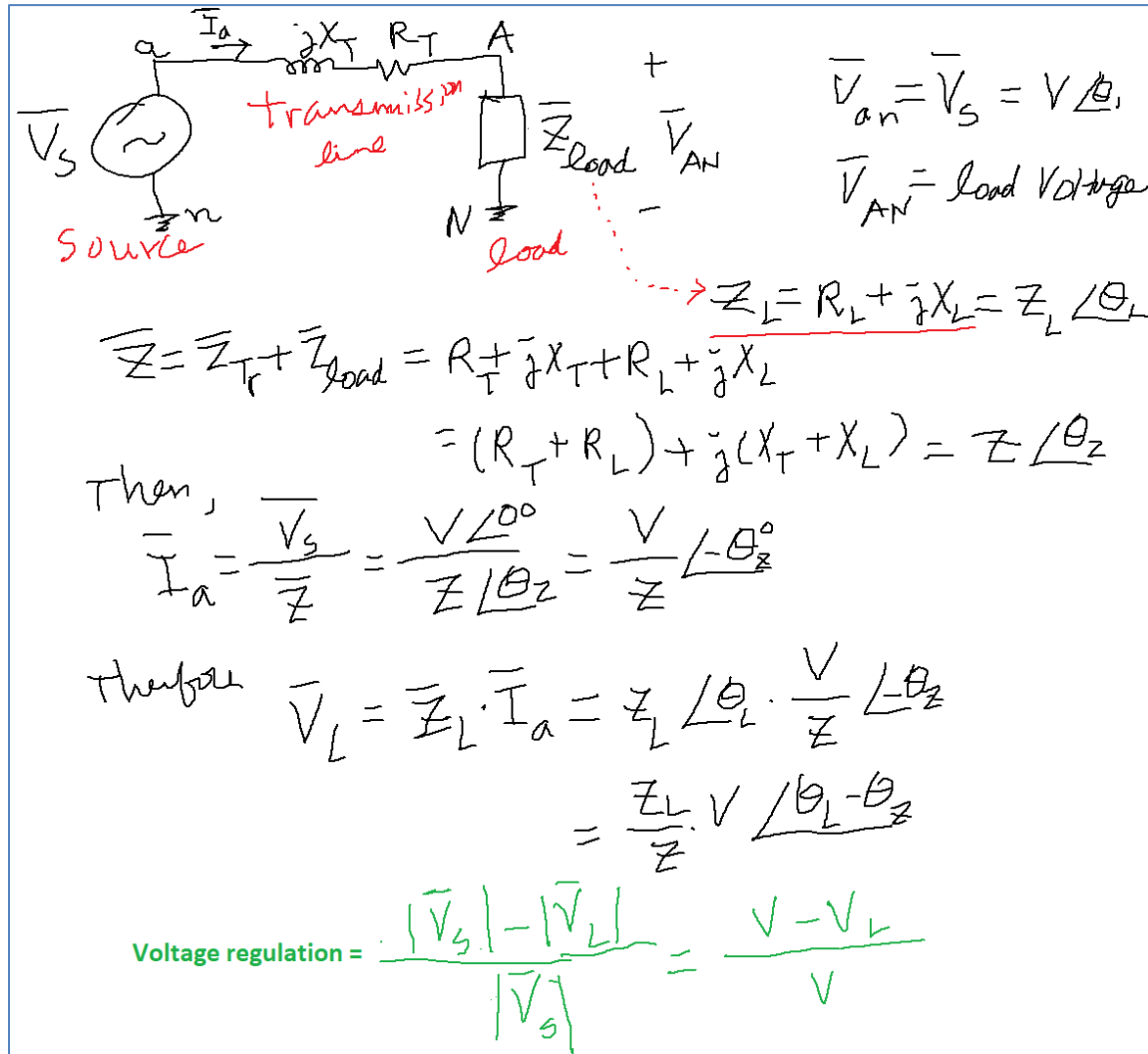


Pre-Lab 4 Power Flow and Voltage Regulation of a Simple Transmission Line

Power from a source to a load can be described by the following diagram and equations thereof:



1. When transmission impedance $\mathbf{Z}_T = R_T + jX_T$ ($R_T = 10$, $X_T = 100$), $\mathbf{V}_s = 10000 + j0$, the load $\mathbf{Z}_L = R_L + jX_L$ ($R_L = 100$, $X_L = 100$), calculate (a) the load voltage \mathbf{V}_{AN} and (b) voltage regulation.
2. When transmission impedance $\mathbf{Z}_T = R_T + jX_T$ ($R_T = 0$, $X_T = 100$), $\mathbf{V}_s = 10000 + j0$, the load $\mathbf{Z}_L = R_L + jX_L$ ($R_L = 100$, $X_L = 100$), calculate (a) the load voltage \mathbf{V}_{AN} and (b) voltage regulation.
3. When transmission impedance $\mathbf{Z}_T = R_T + jX_T$ ($R_T = 10$, $X_T = 100$), $\mathbf{V}_s = 10000 + j0$, the load $\mathbf{Z}_L = R_L + jX_L$ ($R_L = 100$, $X_L = -50$), calculate (a) the load voltage \mathbf{V}_{AN} and (b) voltage regulation.
4. When transmission impedance $\mathbf{Z}_T = R_T + jX_T$ ($R_T = 0$, $X_T = 100$), $\mathbf{V}_s = 10000 + j0$, the load $\mathbf{Z}_L = R_L + jX_L$ ($R_L = 100$, $X_L = -50$), calculate (a) the load voltage \mathbf{V}_{AN} and (b) voltage regulation.