

Question 1

In the balanced three-phase circuit of Fig. 1, when the compensator non-resistive load $Z_C = jX_C$ is disconnected, the readings of the wattmeters are W_1 and W_2 W, and the reading of the voltmeter is V V rms. Find the reactance X_C of the compensator load such that the loss in the transmission line having the impedance Z_T is minimized while the power delivered to the load remains unchanged. Assume that the phase sequence is positive.

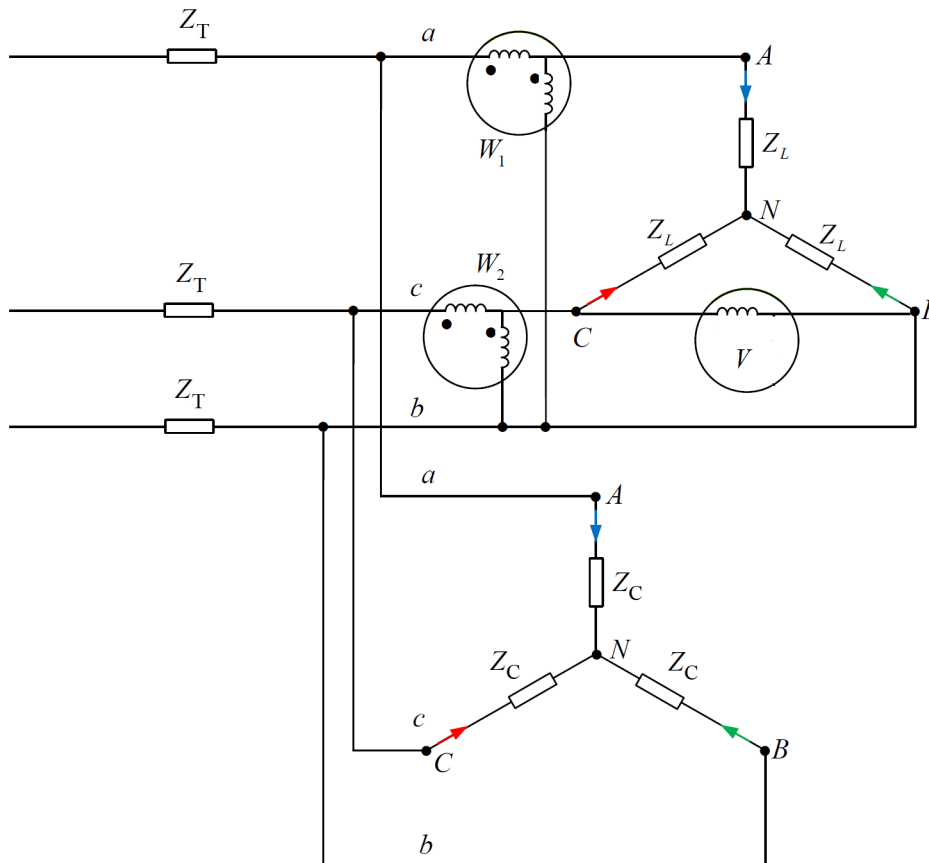


Figure 1: A three-phase balanced circuit.