



Objective: To determine impedance seen looking into node N.

Methodology: Apply a voltage source at N and find the current flowing through that source. Equivalent impedance will be voltage applied divided by current flowing.

Assume that a voltage V_1 is applied at node N and a current I_1 is flowing through that voltage source.

Writing the nodal equation at N,

$$\frac{(V_1 - V)}{Z_1} + \frac{(V_1 + AV)}{Z_2} = I_1 \quad \dots(1)$$

Also Z_1 and Z_2 form an impedance divider network, which implies

$$\frac{(-AV - V)Z_1}{(Z_1 + Z_2)} + V = V_1 \quad \dots(2)$$

$$\rightarrow [(-AV - V)Z_1] + [V(Z_1 + Z_2)] = V_1(Z_1 + Z_2) \quad \dots(3)$$

$$\rightarrow V = \frac{[V_1(Z_1 + Z_2)]}{(-AZ_1 + Z_2)} \quad \dots(4)$$

Substituting (4) in (1) we get

$$I_1 = 0 \text{ ??????}$$