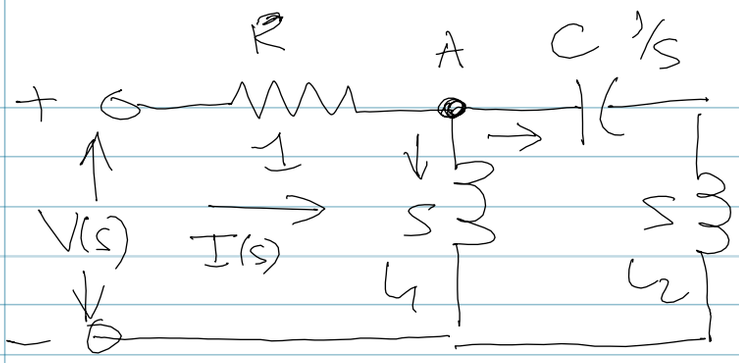
Example 4 Current & Nodal Analysis



$$\frac{V_A - V}{1} + \frac{V_A}{s} + \frac{V_A}{s+1/s} = 0$$

$$V_A\left(1 + \frac{1}{s} + \frac{1}{s+1/s}\right) = V_s(s)$$

$$V_A(s) = \frac{s^3+1}{s^3+2s^2+s+1} V_s(s)$$

$$I(s) = \frac{V_s(s) - V_A(s)}{1} = \left(1 - \frac{s^3+1}{s^3+2s^2+s+1}\right) V_s(s)$$

$$I(s) = \frac{2s^2+1}{s^3+2s^2+s+1} \cdot V_s(s)$$

$$Z(s) = \frac{V_s(s)}{I(s)} = \frac{s^3+2s^2+s+1}{2s^2+1}$$