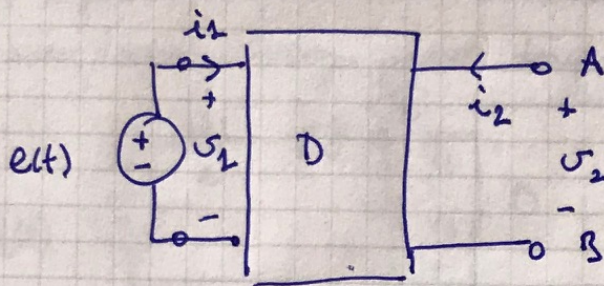The z-parameters of a two-port network are given

$$z_{11} = 1 + s + 2/s \quad, \quad z_{12} = z_{21} = \frac{2}{s} \quad, \quad z_{22} = 2s + \frac{2}{s}$$

The network is connected to a source as shown in Figure. Find the Thevenin equivalent circuit (in s-domain) with respect to the terminal a and b.
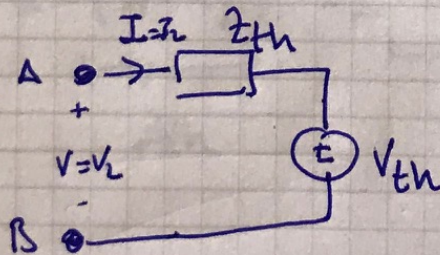

$$V_1 = z_{11} I_1 + z_{12} I_2$$
$$V_2 = z_{21} I_1 + z_{22} I_2$$

$$I_1 = \left(\mathcal{E}(s) - z_{12} I_2 \right) / z_{11}$$

$$V_2 = \frac{z_{21}}{z_{11}} \left(\mathcal{E}(s) - z_{12} I_2 \right) + z_{22} I_2$$

$$V_2 = \frac{z_{11} z_{22} - z_{12} z_{21}}{z_{11}} I_2 + \frac{z_{21}}{z_{11}} \mathcal{E}(s)$$

$$Z_{th} = \frac{z_{11} z_{22} - z_{12} z_{21}}{z_{11}}$$

$$V_{th} = \frac{z_{21}}{z_{11}} \mathcal{E}(s)$$