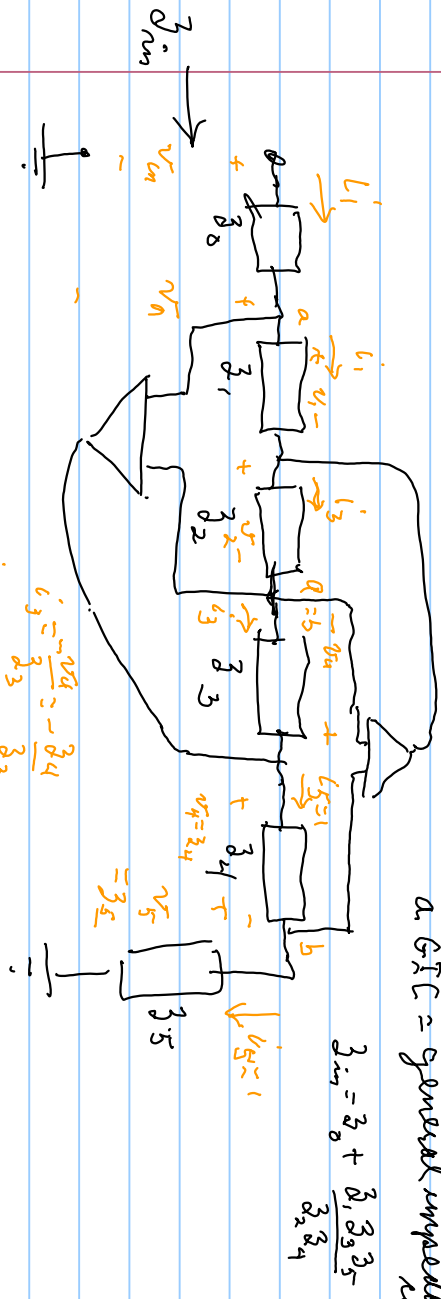


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04/02/18

a. GIC = general impedances converted



$$Z_{in} = Z_0 + \frac{Z_1 Z_2 Z_3}{Z_1 Z_4}$$

$$i_3 = \frac{v_4}{Z_3} = -\frac{Z_4}{Z_3} i_4$$

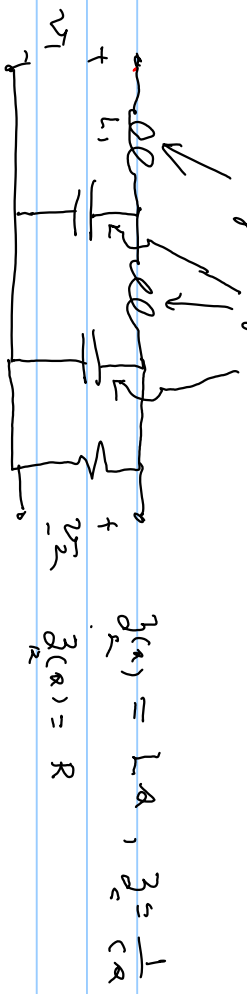
$$i_1 = \frac{1}{Z_1} v_1 = -\frac{Z_2}{Z_1} i_2$$

$$i_1 = \frac{1}{Z_1} \left( -\frac{Z_2 Z_3}{Z_3} v_4 \right)$$

$$Z_{in} \Rightarrow Z_0 + \frac{v_4}{i_1} = Z_0 + \frac{v_4}{i_1} = Z_0 + \frac{Z_1 + Z_5}{i_1}$$

$$= Z_0 + \frac{Z_1 Z_5}{Z_1} = Z_0 + \frac{Z_1 Z_3 Z_4}{Z_2 Z_4} \quad \Omega$$

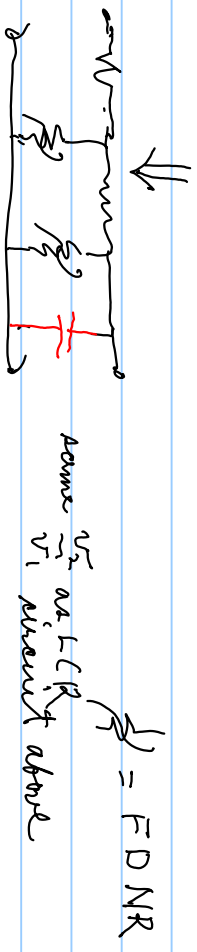
use of FDNR: a pair of  $v_2/v_1$  @  $\infty = a$



$$Z_1(s) = L \Rightarrow R_1 = L \quad \frac{Z_2(s)}{a} = \frac{1}{c a^2} \Rightarrow \text{FDNR}$$

$$R \Rightarrow c = \frac{1}{R} \quad \text{just as a pair @ } \infty = \text{freq}$$

$$\frac{v_2}{v_1} = \frac{\cancel{a} + a_0}{b_1 a^4 + b_3 a^3 + b_2 a^2 + b_0 a + b_0} \times \frac{1/a}{1/a}$$



assume  $v_2/v_1$  at  $\infty = \text{freq}$

