

Ideal transformers

$$v_2 = T v_1$$

$$p_{in}(t) = \dot{L}_1^T v_1 + \dot{L}_2^T v_2 = 0 = \dot{L}_1^T v_1 + \dot{L}_2^T T v_1 = (\dot{L}_1^T + \dot{L}_2^T T) \cdot v_1$$

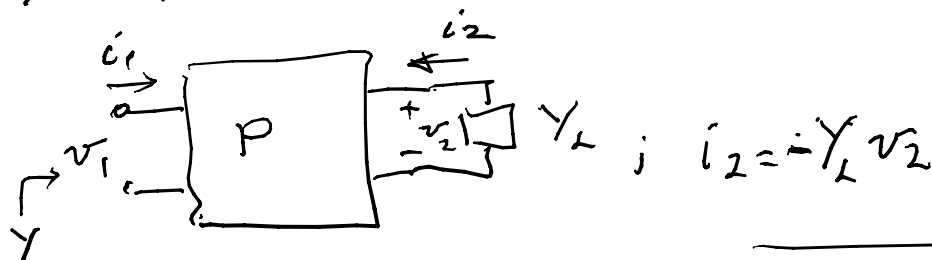
holds for any $v_i \Rightarrow i_1^T = -i_2^T T \Rightarrow i_1 = -T^T i_2$

or $v_2 = T v_1$
 $i_1 = -T i_2$

$$\text{no } Y \text{ or } Z \Rightarrow \begin{aligned} v_1 &= P v_2 \\ i_2 &= -P^T i_1 \end{aligned}$$

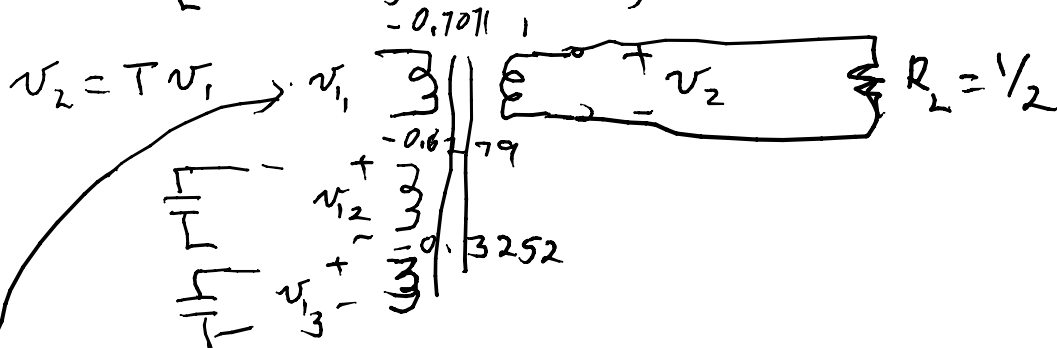
$$Y(a) \cdot v_1 = i_1 \Rightarrow Y(a) T^{-1} v_2 = -T^T i_2 \Rightarrow i_2 = -\overset{-T}{=} T^{-1} Y T^{-1} \cdot v_2$$

$$\underbrace{i_1}_{i_2} \quad \underbrace{\qquad\qquad\qquad}_{-P^T Y P v_2}$$



$$-Y_L v_2 = -T^{-T} Y T^{-1} v_2 \Rightarrow \boxed{\gamma_i = T^T Y_L T}$$

$$\hat{\Sigma}_T: T = [-0.7071, -0.6279, -0.3252]$$



V_{in} after connect the shew part (gyrator)