

Generalized N-port Network Parameters (Appendix B)

General linear 2-port network



General linear 2-port network y-parameters



$$I_1 = y_{11}V_1 + y_{12}V_2$$

$$I_2 = y_{21}V_1 + y_{22}V_2$$

General linear 2-port network y-parameters (short circuit admittance parameters)



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

$$y_{ab} \propto \frac{I_a}{V_b}$$

Defining y-parameters



$$I_1 = y_{11}V_1 + y_{12}V_2$$

$$I_2 = y_{21}V_1 + y_{22}V_2$$

$$y_{11} = \left. \frac{I_1}{V_1} \right|_{V_2=0}$$

Measuring y-parameters



$$I_1 = y_{11}V_1 + y_{12}V_2$$

$$I_2 = y_{21}V_1 + y_{22}V_2$$

$$y_{11} = \left. \frac{I_1}{V_1} \right|_{V_2=0}$$

z-parameters (open circuit impedance)



$$V_1 = z_{11}I_1 + z_{12}I_2$$

$$V_2 = z_{21}I_1 + z_{22}I_2$$

z-parameters (open circuit impedance)

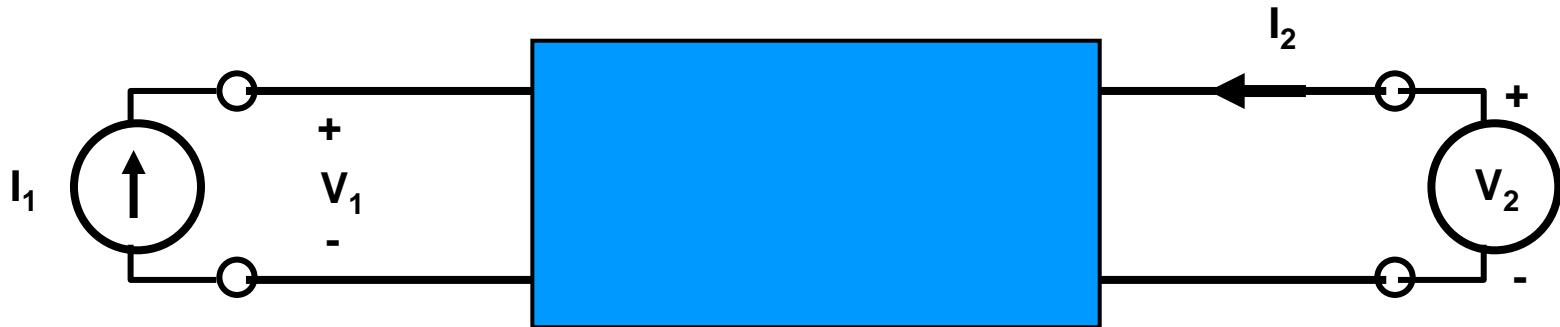


$$V_1 = z_{11}I_1 + z_{12}I_2$$

$$V_2 = z_{21}I_1 + z_{22}I_2$$

$$z_{11} = \left. \frac{V_1}{I_1} \right|_{I_2=0}$$

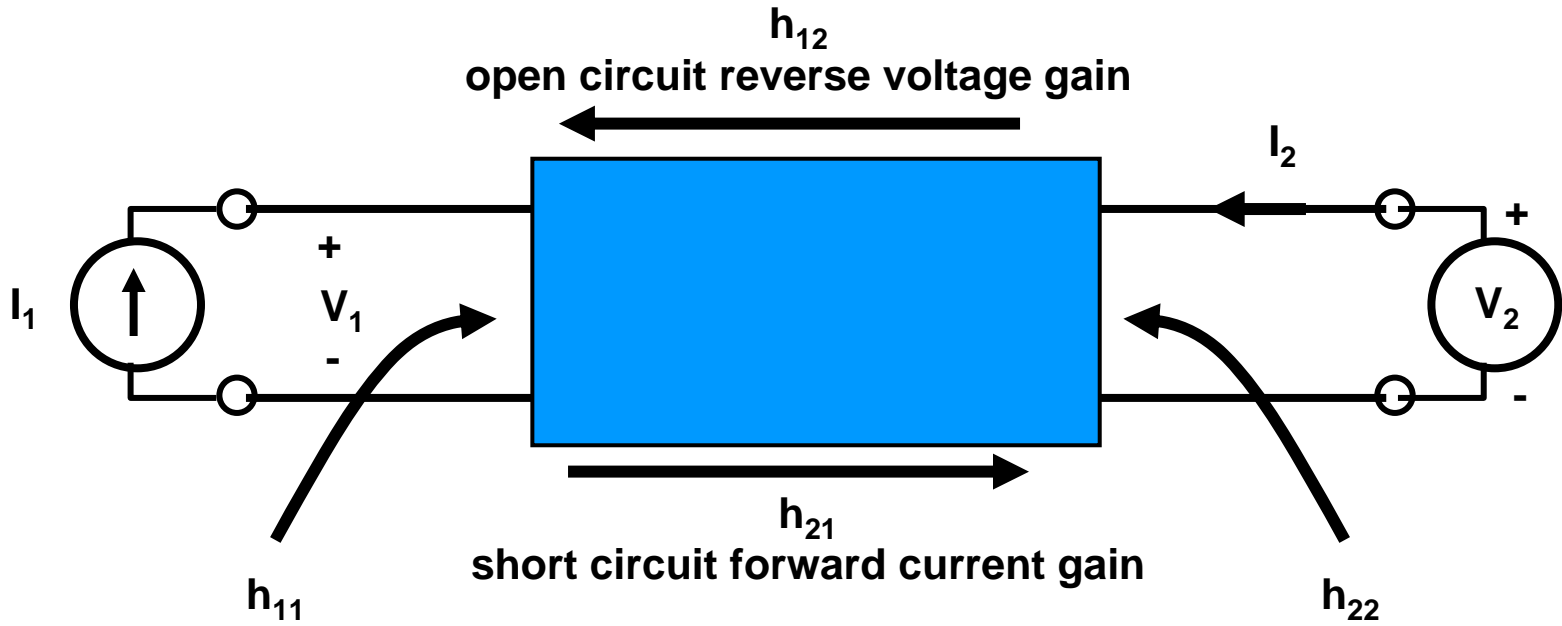
h-parameters (hybrid parameters)



$$V_1 = h_{11}I_1 + h_{12}V_2$$

$$I_2 = h_{21}I_1 + h_{22}V_2$$

h-parameters (hybrid parameters) meaning



$$V_1 = h_{11}I_1 + h_{12}V_2$$

$$I_2 = h_{21}I_1 + h_{22}V_2$$

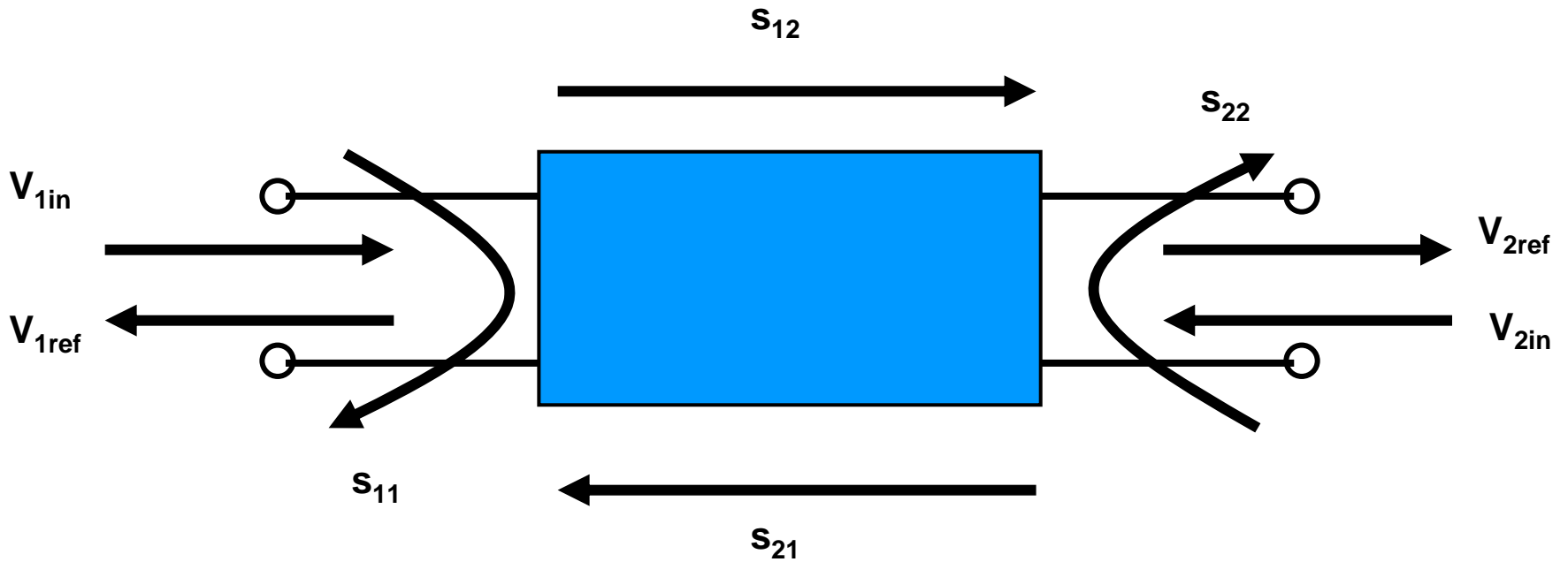
s-parameters (scattering parameters)



$$V_{1ref} = s_{11}V_{1in} + s_{12}V_{2in}$$

$$V_{2ref} = s_{21}V_{1in} + s_{22}V_{2in}$$

s-parameters (scattering parameters)



$$V_{1ref} = s_{11}V_{1in} + s_{12}V_{2in}$$

$$V_{2ref} = s_{21}V_{1in} + s_{22}V_{2in}$$