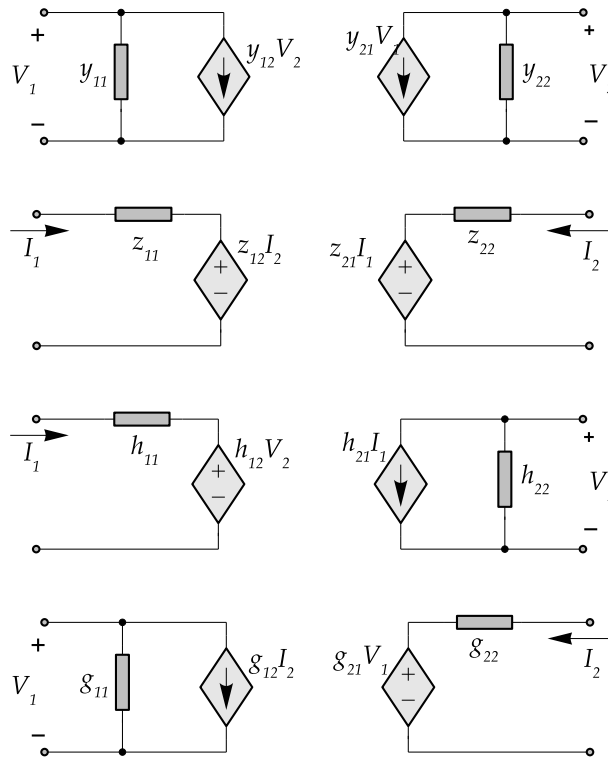


ECE-343 Spring 2009

Two-Port Networks for Feedback

Linear two-port networks can be characterized by their terminal voltage/current relationships. The representations are useful in the analysis of feedback systems — particularly in the description of the feedback circuit which couple the system output back to the system input. Appendix B of Sedra & Smith describes the following “standard” two-port descriptions:



Any of the above networks can be used to describe any linear two-port network. However, in describing feedback circuits, usually one of the above network descriptions simplifies the process.

For *voltage (“series”) mixing*, select either the z or h descriptions (which contain the voltage sources in port 1) in representing the feedback circuit. For *current (“shunt”) mixing*, the y or g parameters become the natural choice. In either case, the port 1 impedance term is associated with the A network, and the port 1 controlled-source coefficient becomes β .

For *voltage (“shunt”) sense* networks, select either the y or h parameters in describing the feedback circuit (so the appropriate voltage becomes the control signal). For *current (“series”) sense* networks, the best choice becomes either the z or g parameters. In either case, the port 2 impedance is associated with the A network. The port 2 controlled source can (we hope!) be neglected. (Otherwise, there’s probably not much gain in going to the two-port description.)