

### Special Problem 4.3-7

A matched, lossless, reciprocal, 4-port network has the following scattering parameters:

$$S_{21} = \frac{-j}{\sqrt{2}}$$

$$S_{42} = \frac{-1}{\sqrt{2}}$$

$$S_{34} = \frac{-j}{\sqrt{2}}$$

- 1) Find the scattering matrix  $\mathbf{S}$  of this 4-port device.
- 2) If port 4 is terminated in a **matched load**, and ports 2 and 3 are **short circuited**, what is the **reflection coefficient** seen when looking into **port 1**?