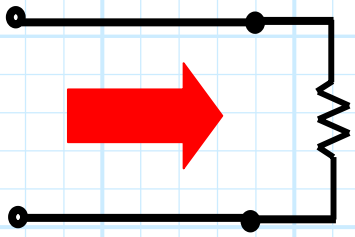
# Return Loss

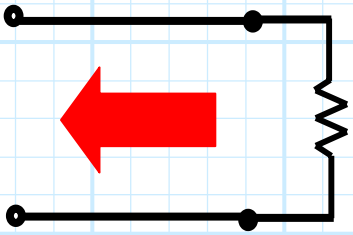
**ICBST** (It Can Be Shown That) the power of the wave **incident** on a load is:

$$P_{inc} = \frac{|V_0^+|^2}{2Z_0}$$



while the power of the **reflected** wave is:

$$P_{ref} = \frac{|V_0^-|^2}{2Z_0} = \frac{|V_0^+\Gamma|^2}{2Z_0}$$



Therefore, we find that:

$$P_{ref} = P_{inc}\,|\Gamma|^2$$

*Q:* How much power $P_{abs}$ is **absorbed** by the load?

*A:*

The **ratio** of the reflected power to the incident power is **return loss**. Typically, return loss is expressed in **dB**:

$$R.L. = -10\,\log_{10}\left[\frac{P_{ref}}{P_{inc}}\right] = -10\,\log_{10}|\Gamma|^2$$

For **example**, if the return loss is **10dB**, then **10%** of the incident power is **reflected** at the load, with the remaining **90%** being **absorbed** by the load.