Let's learn how to use STUBs

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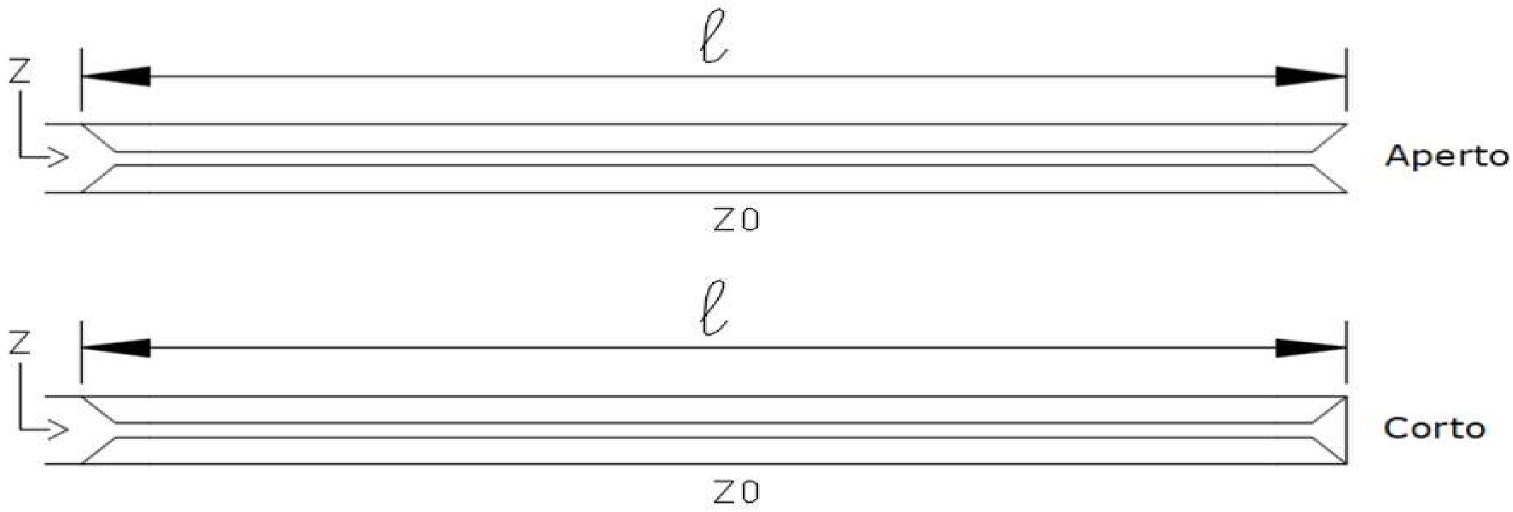
THEORY: Transmission Lines

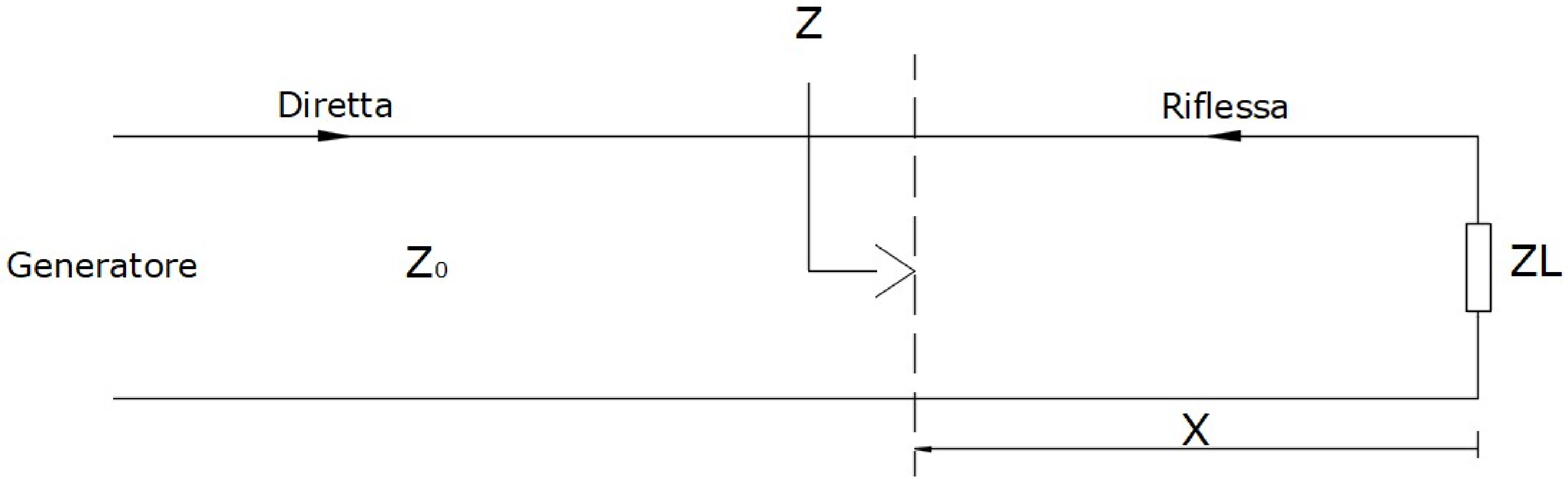


$Z_{oc} = -jZ_0 \cot(2\pi \frac{l_e}{\lambda})$ in the case where the load is an open circuit;

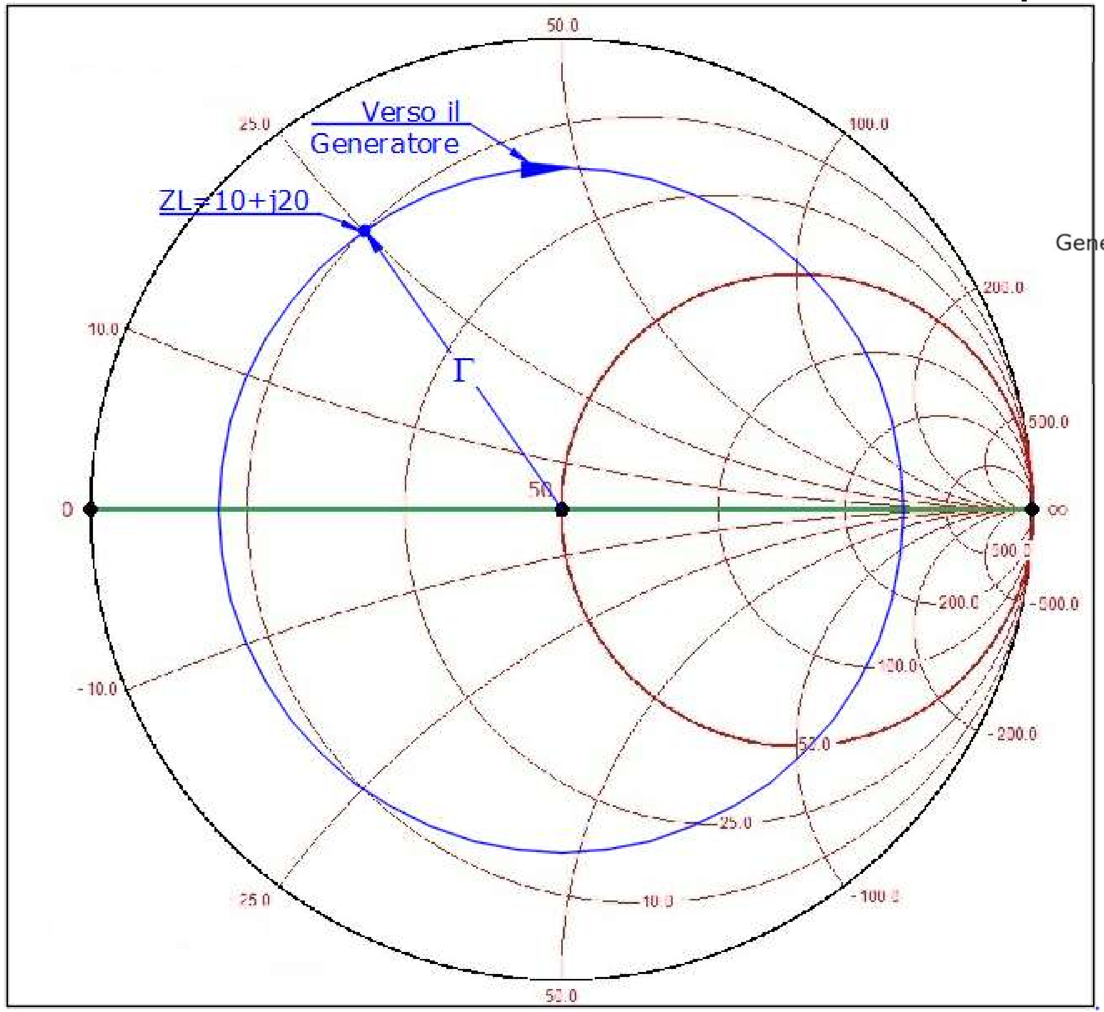
$Z_{cc} = jZ_0 \tan(2\pi \frac{l_e}{\lambda})$ in the case where the load is a short circuit;

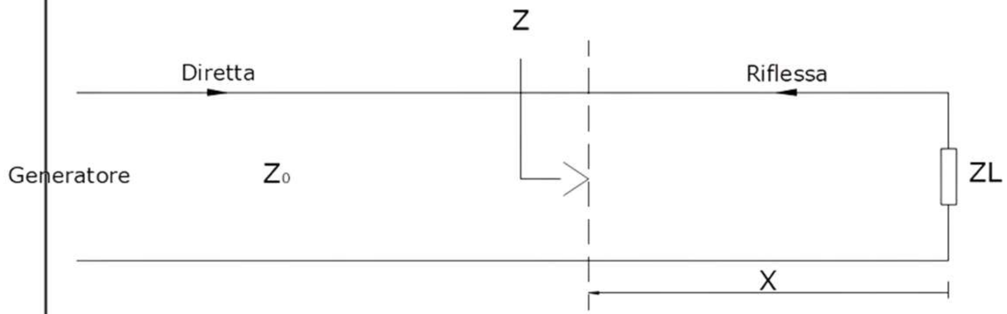
With $\lambda = \frac{300}{f}$ in meters if f is in MHz, and $l_e = \frac{l_f}{VF}$ in meters.

THEORY: Transmission Lines

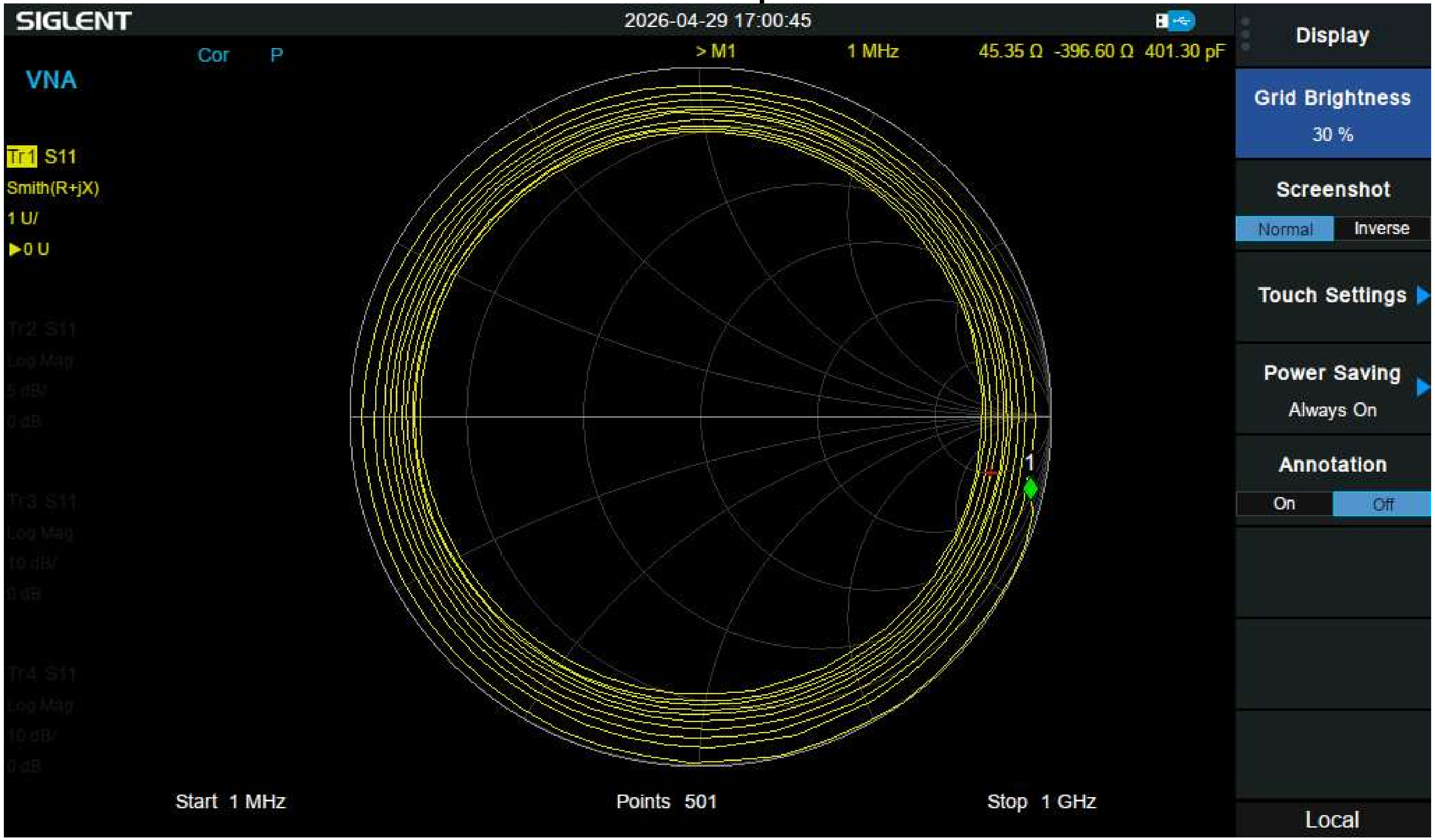


THEORY: Impedance

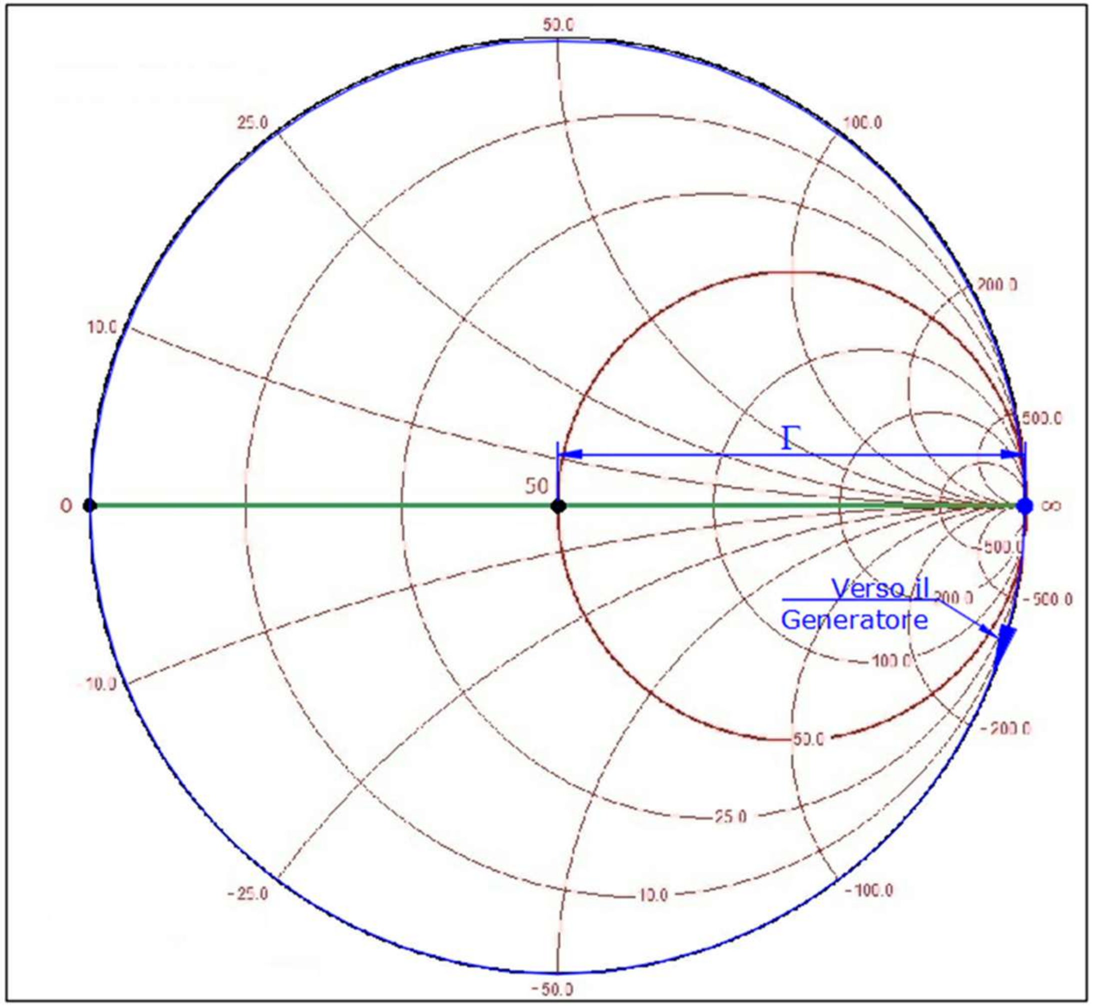




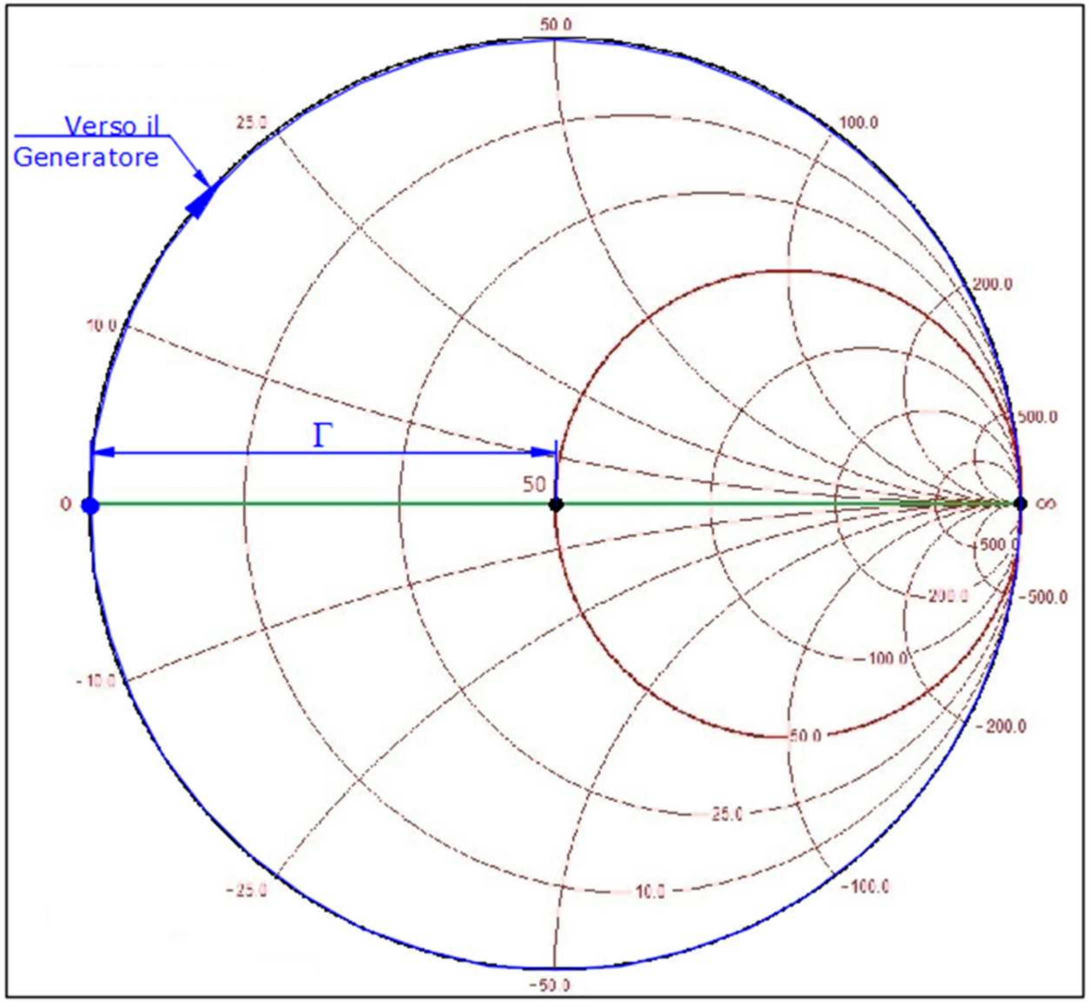
THEORY: Real Open STUB



THEORY: open STUB



THEORY: Short-Circuit STUB



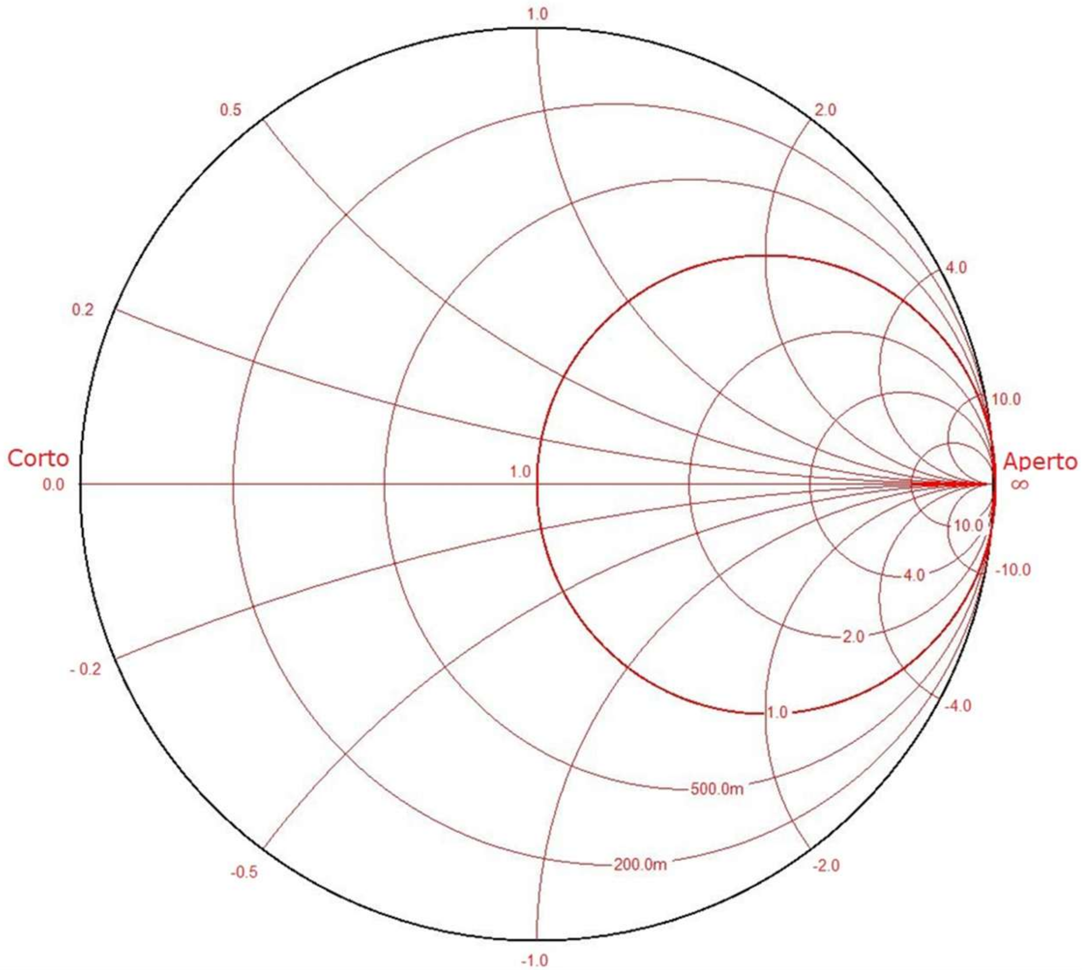
THEORY: Normalized Smith Chart

$$r = \frac{R}{Z_0}$$

$$x = \frac{X}{Z_0}$$

$$R = rZ_0$$

$$X = xZ_0$$



Uses of the STUB

- The main use is to implement matching transformers.
- The second major use is to implement single- or double-STUB impedance adapters.
- The third use is to implement “notch” filters to remove unwanted frequencies from the spectrum.

THEORY: Useful Formulas

$\lambda = \frac{300}{f}$ metri se f è in MHz

$l_e = \frac{l_f}{VF}$ metri se l_f in metri

$VF = \frac{l_f \cdot f}{300 \cdot 0,25}$ l_f in metri ed f in MHz