

Given Γ_R and $Z_R \iff$ Find $\Gamma(d)$ and $Z(d)$

NOTE: the **magnitude** of the **reflection coefficient** is **constant** along a loss-less transmission line terminated by a specified load, since

$$|\Gamma(d)| = |\Gamma_R \exp(-j2\beta d)| = |\Gamma_R|$$

Therefore, on the complex plane, a **circle** with center at the **origin** and radius $|\Gamma_R|$ represents all possible reflection coefficients found along the transmission line. When the **circle of constant magnitude** of the **reflection coefficient** is drawn on the Smith chart, one can determine the values of the line **impedance** at **any location**.

The graphical step-by-step procedure is:

1. Identify the load reflection coefficient Γ_R and the normalized load impedance Z_R on the Smith chart.