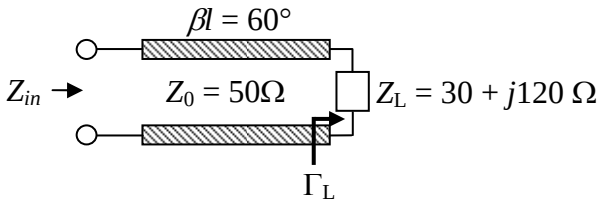
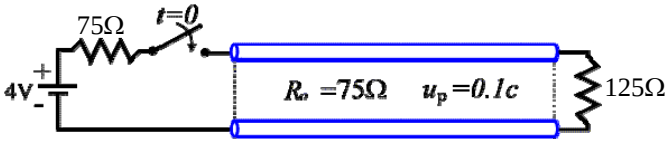
1. (30%) Locate the points in the Smith chart if $Z_0 = 50\ \Omega$ for the following loads:
   (a) $Z_L = 50\ \Omega$, (b) $Z_L = 100 + j60\ \Omega$, (c) $Y_L = 0.012 + j0.016$ S.

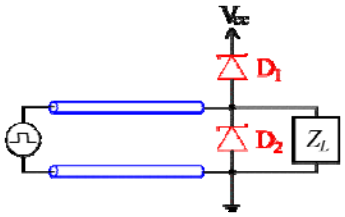
2. (20%) On the Smith Chart, please plot $\bar{z}_L$, $\bar{z}_{in}$, $|\Gamma_L|$, and $\angle\Gamma_L$.



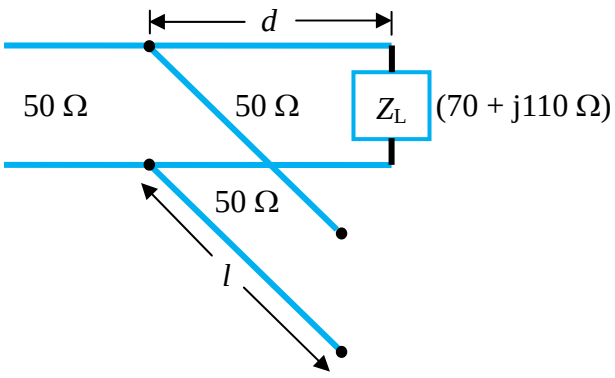
3. (10%) A step change in voltage propagates along a section of transmission line. Please derive voltage at the middle of transmission line after a long enough time (the reflections is settle down).

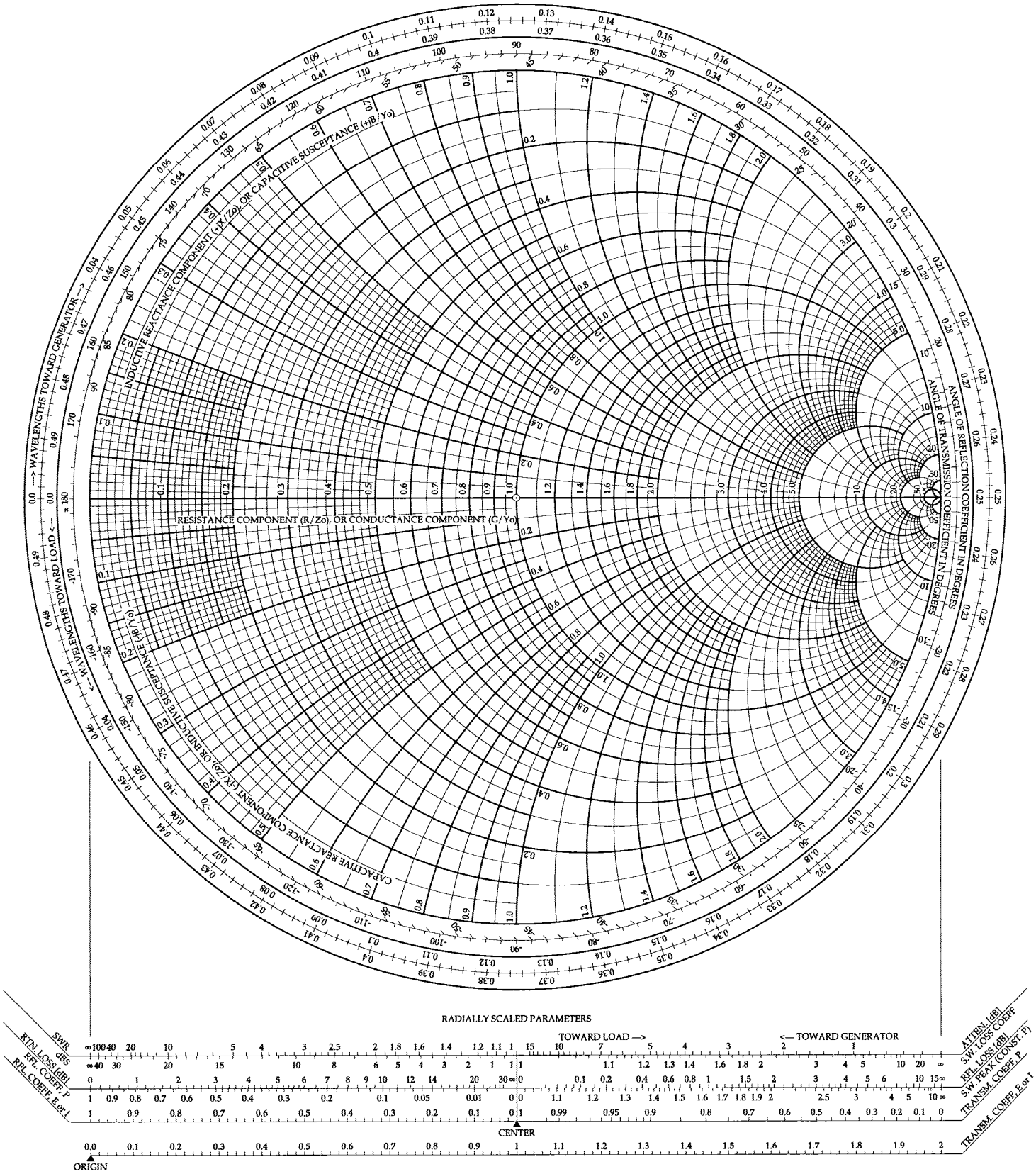


4. (20%) In order to improve high-frequency performance in digital interconnects, a pair of Schottky diodes are often placed at load end of a transmission line. Please explain the purpose of diode D_1 and D_2.



5. (20%) Design the open-ended shunt-stub matching network to match a load $Z_L = 70 + j110\ \Omega$ to a 50-Ω impedance transmission line. Please obtain lengths l and d.




RESISTANCE COMPONENT (R/Zo), OR CONDUCTANCE COMPONENT (G/Yo)
INDUCTIVE REACTANCE COMPONENT (+jX/Zo), OR CAPACITIVE SUSCEPTANCE (+jB/Yo)
CAPACITIVE REACTANCE COMPONENT (-jX/Zo), OR INDUCTIVE SUSCEPTANCE (-jB/Yo)
ANGLE OF REFLECTION COEFFICIENT IN DEGREES
ANGLE OF TRANSMISSION COEFFICIENT IN DEGREES
--> WAVELENGTHS TOWARD GENERATOR -->
<-- WAVELENGTHS TOWARD LOAD <--
RADIALLY SCALED PARAMETERS
TOWARD LOAD -->
<-- TOWARD GENERATOR
SWR
RTN. LOSS (dB)
REFL. COEFF. P
REFL. COEFF. E or I
ATTEN. (dB)
S.W. LOSS COEFF.
REFL. LOSS (dB)
S.W. PEAK (CONST. F)
TRANSM. COEFF. P
TRANSM. COEFF. E or I
CENTER
ORIGIN