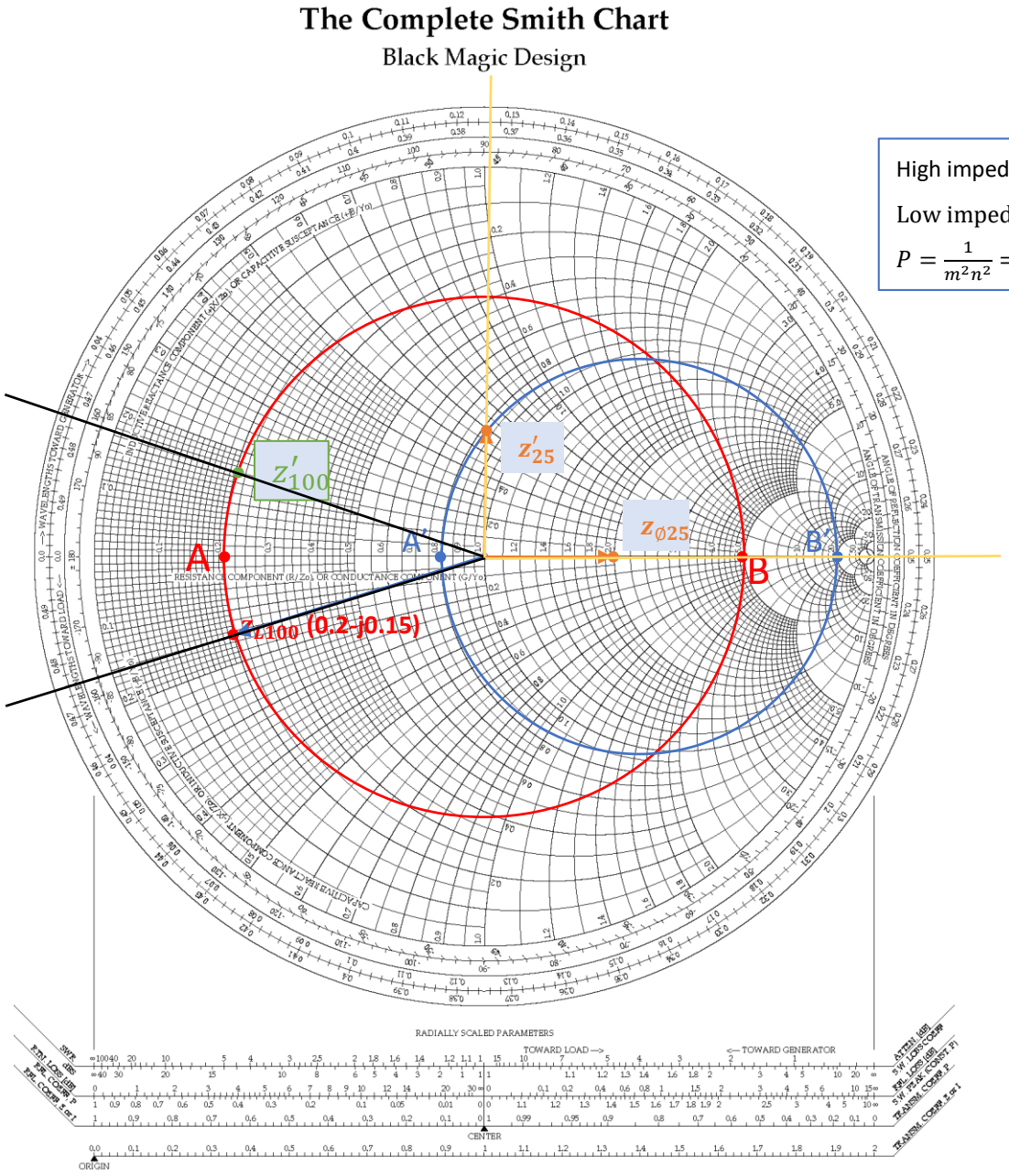
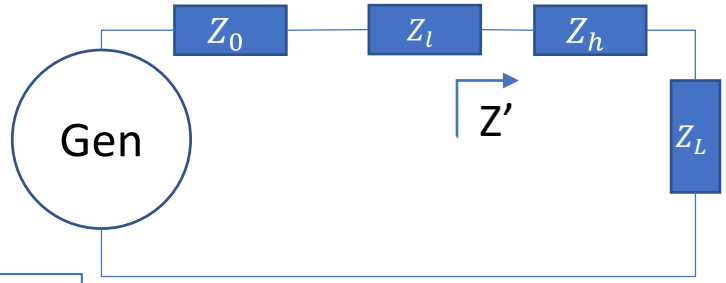



# Kun ZHU

High impedance $Z_h = 100\Omega$ , $m = \frac{Z_h}{Z_0} = \frac{100}{50} = 2$

Low impedance $Z_l = 25\Omega$, n $= \frac{Z_0}{Z_l} = \frac{50}{25} = 2$

$P = \frac{1}{m^2 n^2} = 0.0625$, Q$= \frac{1}{n^2} = 0.25$ , R $= n^2 = 4$ , R $= n^2 m^2 = 16$




Load $Z_L = 20 - j15$, normalize to generator

$z_L = \frac{Z_L}{Z_0} = \frac{20-j15}{50} = 0.8 - j0.6$, which falls in $Z_h$ region, so $Z_h$ is closer to load

Load $Z_L = 20 - j15$, normalize to $Z_h = 100\Omega$

$z_{L100} = \frac{Z_L}{Z_h} = \frac{20-j15}{100} = 0.2 - j0.15$

So point A = 0.2, B = 5

Renormalize A & B to Load $Z_l = 25\Omega$

$A' = A \times \frac{100}{25} = 0.8$ , $B' = B \times \frac{100}{25} = 20$

Generator normalize to $Z_l = 25\Omega$

$z_{\emptyset 25} = \frac{50}{25} = 2$

By smith chart, $z'_{25} = 0.84\Omega + j0.77\Omega$

$Z'$ is seen at $Z_l = 25\Omega$ from $Z_h = 100\Omega$

De-normalize$Z' = z'_{25} \times 25 = (0.81 + j0.6) \times 25 = 20.25\Omega + j15\Omega$

Renormalize $Z'$to $Z_h$ , $z'_{100} = \frac{Z'_{100}}{100} = \frac{20.25+j15}{100} = 0.2 + j0.15$

Given f=4GHz, From smith chart,

$\lambda_h = (0.5 - 0.476) + 0.026 = 0.05\lambda \rightarrow Degree_h = 18°$

$W_h = 0.74913mm, L_h = 2.19827mm$

$\lambda_l = 0.25 - 0.126 = 0.124\lambda \rightarrow Degree_l = 44.64°$

$W_l = 8.61031mm, L_l = 4.97798mm$