2.69 Repeat Problem 2.68 for a load with $Z_L = (100 + j50)\ \Omega$.

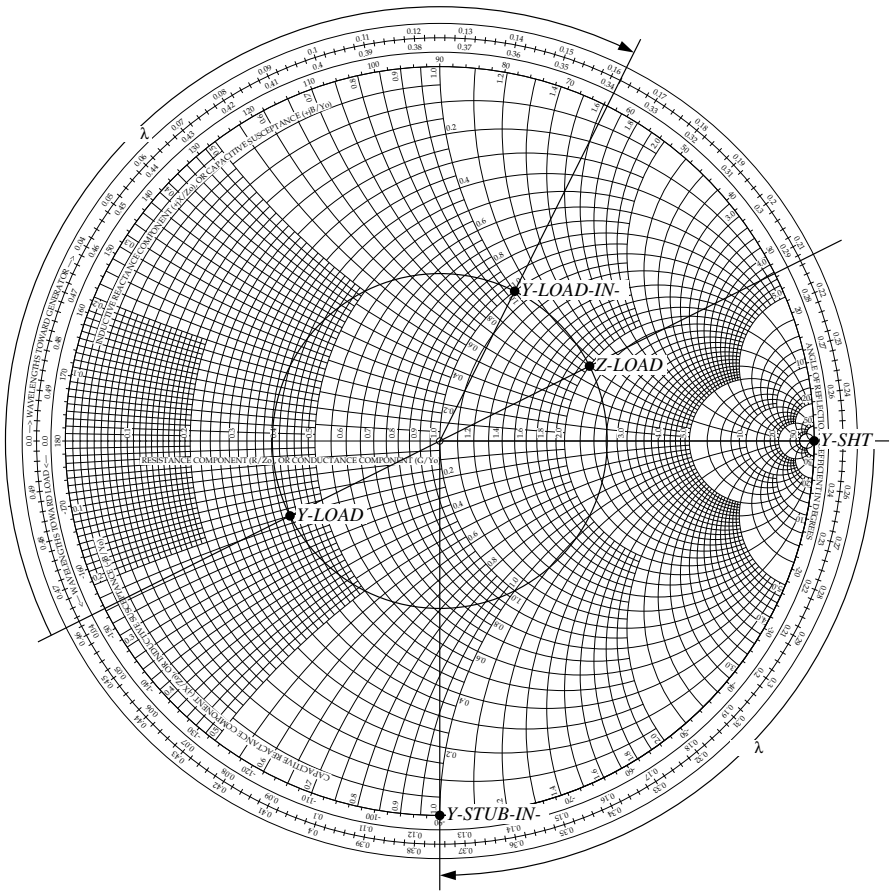

Figure 2.69: (a) First solution to Problem 2.69.

Solution: Refer to Fig. P2.69(a) and Fig. P2.69(b), which represent two different solutions.

$$z_L = \frac{Z_L}{Z_0} = \frac{100 + j50\ \Omega}{50\ \Omega} = 2 + j1$$

and is located at point *Z-LOAD* in both figures. Since it is advantageous to work in admittance coordinates, y_L is plotted as point *Y-LOAD* in both figures. *Y-LOAD* is at 0.463λ on the WTG scale.

For the first solution in Fig. P2.69(a), point *Y-LOAD-IN*-1 represents the point at which $g = 1$ on the SWR circle of the load. *Y-LOAD-IN*-1 is at 0.162λ on the

WTG scale, so the stub should be located at $0.162\lambda - 0.463\lambda + 0.500\lambda = 0.199\lambda$ from the load (or some multiple of a half wavelength further). At *Y-LOAD-IN*-1, $b = 1$, so a stub with an input admittance of $y_{\text{stub}} = 0 - j1$ is required. This point is *Y-STUB-IN*-1 and is at 0.375λ on the WTG scale. The short circuit admittance is denoted by point *Y-SHT*, located at 0.250λ. Therefore, the short stub must be $0.375\lambda - 0.250\lambda = 0.125\lambda$ long (or some multiple of a half wavelength longer).

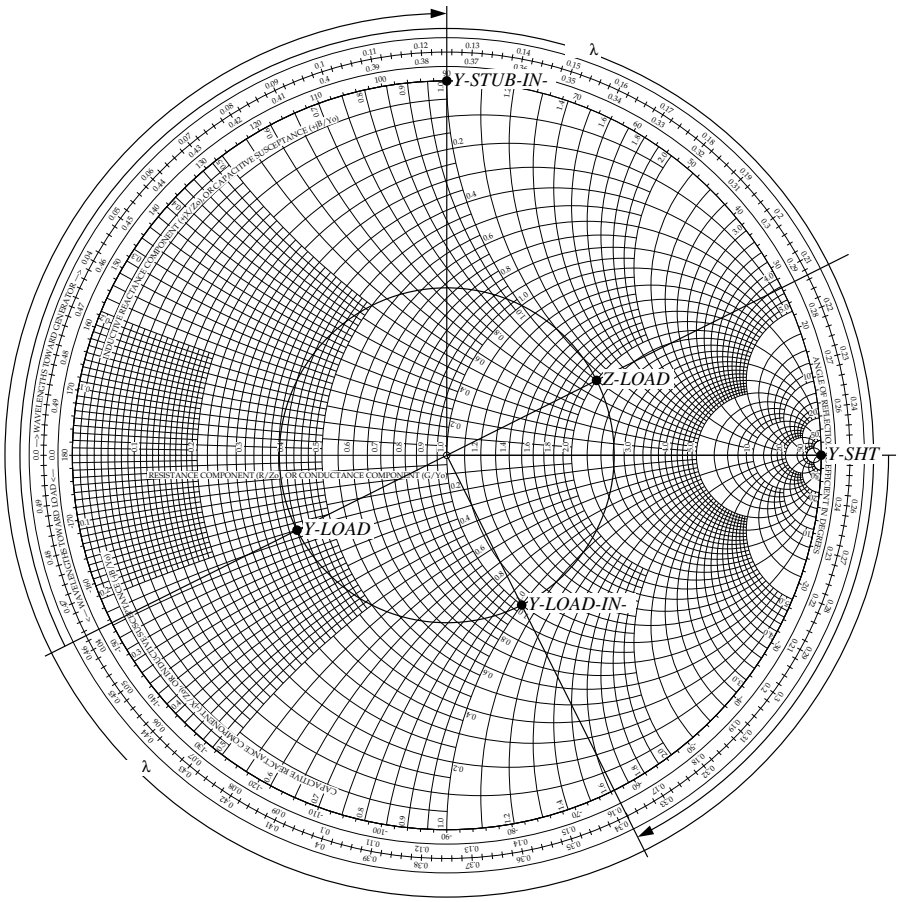

Figure P2.69: (b) Second solution to Problem 2.69.

For the second solution in Fig. P2.69(b), point *Y-LOAD-IN*-2 represents the point at which $g = 1$ on the SWR circle of the load. *Y-LOAD-IN*-2 is at 0.338λ on the WTG scale, so the stub should be located at $0.338\lambda - 0.463\lambda + 0.500\lambda = 0.375\lambda$ from the load (or some multiple of a half wavelength further). At *Y-LOAD-IN*-2, $b = -1$, so a stub with an input admittance of $y_{\text{stub}} = 0 + j1$ is required. This point

is *Y-STUB-IN*-2 and is at 0.125λ on the WTG scale. The short circuit admittance is denoted by point *Y-SHT*, located at 0.250λ. Therefore, the short stub must be $0.125\lambda - 0.250\lambda + 0.500\lambda = 0.375\lambda$ long (or some multiple of a half wavelength longer).