

7.10 Design a Wilkinson power divider with a power division ratio of $P_3/P_2 = 1/3$ and a source impedance of 75Ω .

- Change to 75Ω source impedance. Also, draw labeled sketch of design.

Per p.332, $K^2 = P_3 / P_2 = 1/3 = 0.33$ and $K = 0.57735$.

Per (7.37a), $Z_{03} = Z_0 \sqrt{\frac{1+K^2}{K^3}} = 75 \sqrt{\frac{1+0.33}{0.57735^3}} \Rightarrow \underline{Z_{03} = 197.4111 \Omega}.$

Per (7.37b), $Z_{02} = K^2 Z_{03} = 0.33(197.4111) \Rightarrow \underline{Z_{02} = 65.8037 \Omega}.$

Per (7.37c), $R = Z_0(K + 1/K) = 75(0.57735 + 1/0.57735) \Rightarrow \underline{R = 173.2051 \Omega}.$

Per p.332, the port 2 output impedance is $R_2 = Z_0 K = 75(0.57735) \Rightarrow \underline{R_2 = 43.3013 \Omega}.$

Per p.332, the port 3 output impedance is $R_3 = Z_0 / K = 75/0.57735 \Rightarrow \underline{R_3 = 129.9038 \Omega}.$

