5.1.

$$T(j\omega) = \frac{(j\omega)^2 + 9}{(j\omega)^2 + j\omega\sqrt{2} + 1}$$

$$T(j\omega) = \frac{-\omega^2 + 9}{-\omega^2 + j\omega\sqrt{2} + 1}$$

$$|T(j\omega)| = \frac{\sqrt{(-\omega^2 + 9)^2}}{\sqrt{(-\omega^2+1)^2 + (\omega\sqrt{2})^2}}$$

$$\Delta T(j\omega) = 0 - tg^{-1}\left(\frac{\omega\sqrt{2}}{-\omega^2+1}\right)$$

5.2. $$T(j\omega) = \frac{(j\omega)^2 + 1/9}{(j\omega)^2 + j\omega/5 + 1}$$

$$T(j\omega) = \frac{-\omega^2 + 1/9}{-\omega^2 + j\omega/5 + 1}$$

$$|T(j\omega)| = \frac{\sqrt{(-\omega^2 + 1/9)^2}}{\sqrt{(-\omega^2+1)^2 + (\omega/5)^2}}$$

$$\Delta T = 0 - tg^{-1}\left(\frac{\omega/5}{-\omega^2+1}\right)$$

5.3. $$T(j\omega) = \frac{(j\omega)^2 + j\omega/5 + 1}{(j\omega)^2 + j\omega\sqrt{2} + 1} = \frac{-\omega^2 + j\omega/5 + 1}{-\omega^2 + j\omega\sqrt{2} + 1}$$

$$|T(j\omega)| = \frac{\sqrt{(-\omega^2+1)^2 + (\omega/5)^2}}{\sqrt{(-\omega^2+1)^2 + (\omega\sqrt{2})^2}}$$

$$\Delta T = tg^{-1}\left(\frac{\omega/5}{-\omega^2+1}\right) - tg^{-1}\left(\frac{\omega\sqrt{2}}{-\omega^2+1}\right)$$