(2)

(a) • $\lim_{\omega \to 0} (A/f)(\omega) = \lim_{\omega \to 0} \frac{1}{\sqrt{(\omega_0^2 - \omega^2)^2 + (b\omega)^2}}$

$= \frac{1}{\omega_0^2}$

• $\lim_{\omega \to 0^+} [\tan \phi(\omega)] = \lim_{\omega \to 0^+} \left[\frac{b\omega}{\omega^2 - \omega_0^2} \right] = 0,$

$\Rightarrow \phi(\omega \to 0) = 0, \pi.$

In order to know which of the two is the solution, we have to look at $\cos \phi(\omega)$ as well:

$\lim_{\omega \to 0} \cos \phi(\omega) = \lim_{\omega \to 0} \frac{\omega_0^2 - \omega^2}{\sqrt{(\omega_0^2 - \omega^2)^2 + (b\omega)^2}} = +1$

$\Rightarrow \lim_{\omega \to 0} \phi(\omega) = 0$

(b) Applying the same method in the limit $\omega \to \infty$, we find:

• $\lim_{\omega \to +\infty} (A/f)(\omega) = \lim_{\omega \to +\infty} \frac{}{\sqrt{(\omega_0^2 - \omega^2)^2 + (b\omega)^2}} = 0$