Next, let us evaluate $(A/f)(\omega)$ at $\omega = \omega_0$, $\omega_{1,2} = \omega_0 \pm \frac{b}{2}$ in this limit. Keeping the lowest non-vanishing order in b, we get:

- $$\left(A/f\right)(\omega=\omega_0) = \frac{1}{\sqrt{(\omega_0^2-\omega_0^2)^2+(b\omega_0)^2}} = \frac{1}{b\omega_0}$$
$$= \left(A/f\right)_{max}$$

- $$\left(A/f\right)(\omega=\omega_1) = \frac{1}{\sqrt{(\omega_0^2-\omega_1^2)^2+(b\omega_1)^2}}$$

$$= \frac{1}{\sqrt{\left[\omega_0^2-\left(\omega_0+\frac{b}{2}\right)^2\right]^2 + b^2\left(\omega_0+\frac{b}{2}\right)^2}}$$

$$= \frac{1}{\sqrt{\left(\cancel{\omega_0^2}-\cancel{\omega_0^2}-b\omega_0-\cancel{\frac{b^2}{4}}\right)^2+b^2\omega_0^2+\cancel{\frac{b^4}{2}}}}$$

$$= \frac{1}{\sqrt{b^2\omega_0^2+b^2\omega_0^2}} = \frac{1}{\sqrt{2}}\frac{1}{b\omega_0} = \left(A/f\right)(\omega=\omega_2)$$

[In the above calculation, we used $b^2 \ll b\omega_0$ and $b^4 \ll b^2\omega_0^2$, which follow directly from $b \ll \omega_0$.]