The ***magnitude*** of the complex velocity amplitude $\tilde{v}_o(\omega)$ of the microphone diaphragm is:

$$|\tilde{v}_o(\omega)| \equiv \sqrt{v_{or}^2(\omega)+v_{oi}^2(\omega)} = \omega\left(\frac{p_o A_{dia}}{m_{dia}}\right)\frac{1}{\sqrt{\left(\omega_o^2-\omega^2\right)^2+\omega^2\gamma_{dia}^2}}$$

If we again define $x(\omega)\equiv \omega/\omega_o$ and $y\equiv \gamma_{dia}/\omega_o$ then we can rewrite the {normalized} magnitude of the complex velocity amplitude $\tilde{v}_o(\omega)$ and *v*-phase as:

$$v\text{-Res}(x(\omega)) \equiv \frac{\omega_o|\tilde{v}_o(\omega)|}{\left(\frac{p_o A_{dia}}{m_{dia}}\right)} = \frac{\left(\frac{\omega}{\omega_o}\right)}{\sqrt{\left[1-\left(\frac{\omega}{\omega_o}\right)^2\right]^2+\left(\frac{\omega}{\omega_o}\right)^2\left(\frac{\gamma_{dia}}{\omega_o}\right)^2}} = \frac{x}{\sqrt{\left(1-x^2\right)^2 + x^2y^2}}$$

$$\varphi_v(\omega) = \tan^{-1}\left(\frac{\left(\omega_o^2-\omega^2\right)}{\omega\gamma_{dia}}\right) = \tan^{-1}\left(\frac{1-\left(\frac{\omega}{\omega_o}\right)^2}{\left(\frac{\omega}{\omega_o}\right)\left(\frac{\gamma_{dia}}{\omega_o}\right)}\right) = \tan^{-1}\left(\frac{1-x^2}{x\cdot y}\right)$$

We again have the usual three conditions of ***underdamped***, ***critically damped*** and ***overdamped*** motion for $y\equiv\gamma_{dia}/\omega_o \ll 1$, $y\equiv\gamma_{dia}/\omega_o = 1$ and $y\equiv\gamma_{dia}/\omega_o \gg 1$, respectively. The following two color-coded figures show normalized *v*-Res(*x*) *vs*. *x* and *v*-Phase(*x*) *vs*. *x* for *y* = 0.05 (pink), 1.0 (cyan) and 10.0 (violet):