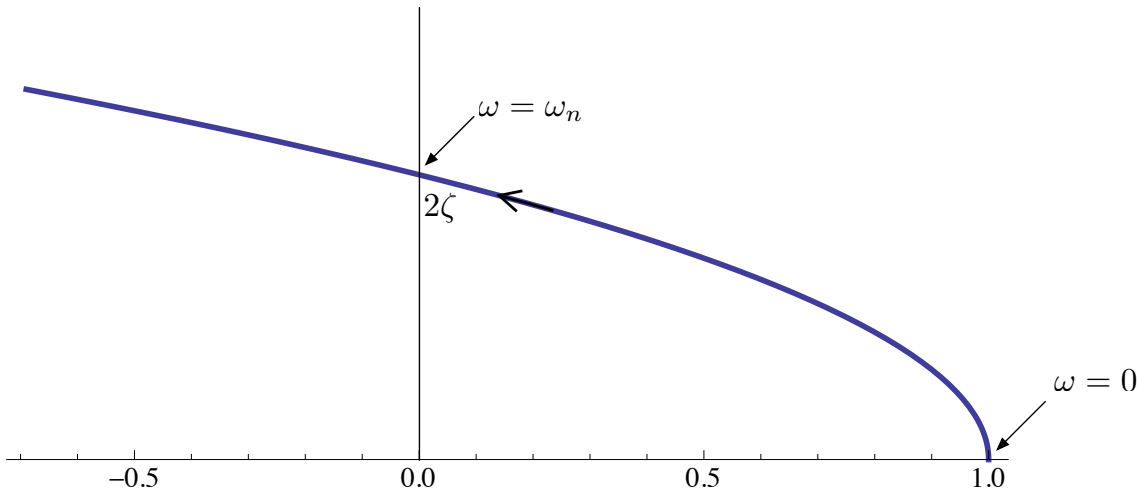
Type 3: $\left(\frac{j\omega}{\omega_n}\right)^2 + 2\zeta\frac{j\omega}{\omega_n} + 1$

Stable complex zero — more difficult than Types 1 & 2.

First step — let's rewrite in Cartesian form:

$$\left(\frac{j\omega}{\omega_n}\right)^2 + 2\zeta\frac{j\omega}{\omega_n} + 1 = \left(1 - \left(\frac{\omega}{\omega_n}\right)^2\right) + 2\zeta\frac{\omega}{\omega_n}j$$

And here is the Nyquist plot, for $0 < \omega < \infty$:



$$(R(\omega), I(\omega)) = \left(1 - \left(\frac{\omega}{\omega_n}\right)^2, 2\zeta\frac{\omega}{\omega_n}\right)$$