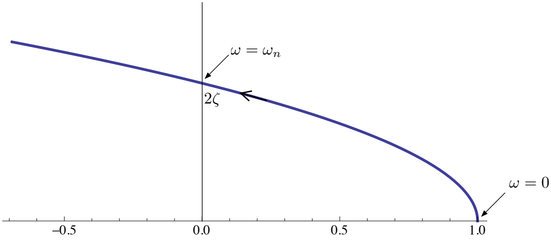
Type 3: $\left(\frac{j\omega}{\omega_n}\right)^2 + 2\zeta\frac{j\omega}{\omega_n} + 1$

Nyquist plot, for $0 < \omega < \infty$:



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

Some obvious points: $\omega = 0 \rightarrow 1 + 0j$

$\omega = \omega_n \rightarrow 0 + 2\zeta j$

What happens as $\omega \rightarrow \infty$?

- real part $\approx -(\omega/\omega_n)^2 \rightarrow -\infty$, quadratic in ω
- imaginary part $= 2\zeta(\omega/\omega_n) \rightarrow \infty$, linear in ω