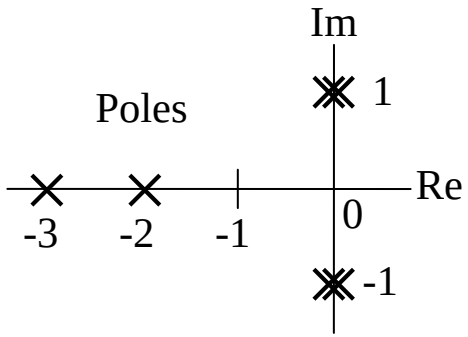
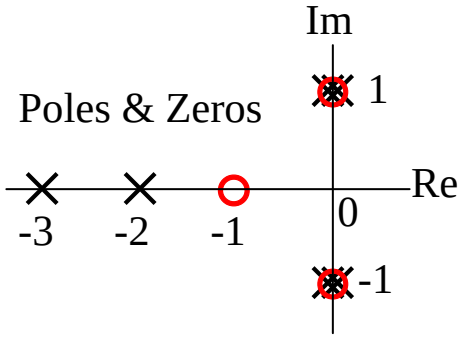
EXAMPLE: Pole-Zero Cancellation

$$G(s) = \underbrace{\frac{s^3 + s^2 + s + 1}{(s^2+1)(s^2+1)(s+2)(s+3)}}_{\text{Imaginary Double-Poles suggest UNSTABLE}} = \underbrace{\frac{\cancel{(s^2+1)}(s+1)}{(s^2+1)\cancel{(s^2+1)}(s+2)(s+3)}}_{\text{Pole-Zero Cancellation}} = \underbrace{\frac{(s+1)}{(s^2+1)(s+2)(s+3)}}_{\text{Actually MARGINALLY STABLE}}$$





One zero will cancel one pole at the same location