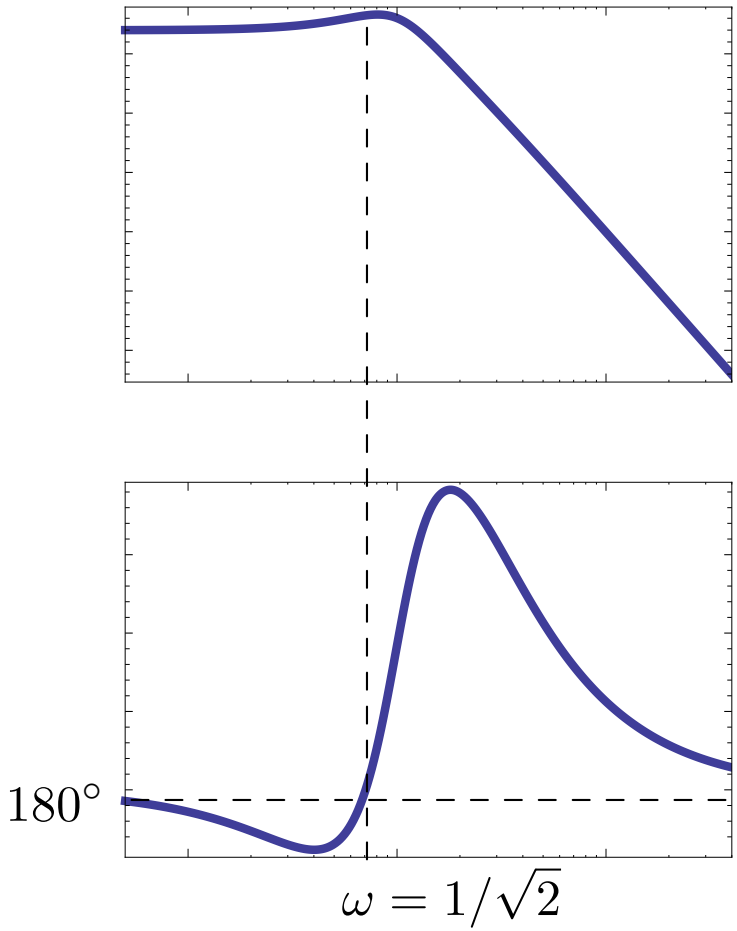
Example 3

$$G(s) = \frac{s-1}{(s+2)(s^2-s+1)} \qquad \text{(2 open-loop RHP poles)}$$

Bode plot (tricky, RHP poles/zeros)



$\phi = 180°$ when:

- $\omega = 0$ and $\omega \to 0$
- $\omega = 1/\sqrt{2}$:

$$\frac{j\omega - 1}{(j\omega - 1)((j\omega)^2 - j\omega + 1)}\Big|_{\omega=1/\sqrt{2}}$$

$$= \frac{\frac{j}{\sqrt{2}} - 1}{\left(\frac{j}{\sqrt{2}} + 2\right)\left(-\frac{1}{2} - \frac{j}{\sqrt{2}} + 1\right)}$$

$$= \frac{\frac{j}{\sqrt{2}} - 1}{-\frac{3}{2}\left(\frac{j}{\sqrt{2}} - 1\right)} = -\frac{2}{3}$$

(need to guess this, e.g., by mouseclicking in Matlab)